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SOIL CONSERVATION—INDEX TO VOLUME 38

United States Department of Agriculture, Soil Conservation Service

August 1972 to July 1973

Achievement, 1972—summary of activities of the Soil Conservation Service for fiscal year 1972, pp. 139–146

ACT(S)—

Conservancy District, first statewide mandatory soil conservation law (Iowa), p. 190

Flood insurance, p. 50

Food and Agriculture Act of 1962, p. 238

AFRICA, soil and water conservation projects, p. 3

After coal—what? David Oberwager, pp. 198–199

Agency for International Development—

programs in Algeria, Brazil, Ecuador, India, Nicaragua, Nigeria, Senegal, Thailand, Tunisia, Turkey, Vietnam, Zambia, pp. 3–6

Agricultural Research Service—

builds grass seed stripper (Tex.), p. 80

estimates soil materials in streams, p. 117

ground water-channel improvement study (N.C.), p. 59

releases 'Emerald Sea' (Md.), p. 77

seed stocks (Kans.), p. 79

Agricultural Stabilization and Conservation Service—

administered funds, Hurricane Camille (W. Va.), p. 11

cost shares—

beef cow-calf project (Mich.), p. 56

conservation practices (Iowa), p. 36

conservation tillage (Ill.), p. 43

emergency practices, Hurricane Camille (Va.), p. 10

provides cost-share assistance in Great Plains, p. 260

programs effect land use, p. 212

ALABAMA—

Birmingham suburb, as a new town, planned from soils information, p. 98

underground system for disposing of excess water, p. 46

ALGERIA, soil and water program progress, p. 3

Allan, David N.: *We care about birds*. With Patrick W. Grace, pp. 171–173

Allen, Dale D.—

A forb in your future, p. 71

Grass seed stripper under scrutiny, pp. 80–81

Allen, James, mayor (La.), p. 230

And on the farm there was a golf course. C. E. Perrott, pp. 275–276

Anker, Leonard A.: *A most unusual district*, pp. 272–273

Annual report, SCS, fiscal year 1972, pp. 139–146

APPALACHIA—

cattle farmers' beef on rural vacationing properties (Va.), p. 194

Cromline Creek watershed pilot program (N.Y.), pp. 147–149

ARIZONA, Bowie Exchange Freeway overpass, lovegrasses and other plants, p. 84

Army, Department of, helps pay for soil survey (N.C.), p. 108

Army, U.S.—

Fort Niobrara, (Nebr.), p. 163

Hoxie, Lt. R. L. (Utah), pp. 72–73

Arpin, Laurence A.: *Boy power in conservation*, pp. 128–130

ASIA, soil and water conservation projects, p. 3

Aten, Fred: *Plant a pack of packeted plants*, p. 55

Atilla, Atif: *Conservation breaks cotton cycle*. With S. H. Fuchs, pp. 12–13

Audiovisuals—

"A Special Genius"—SCS multimedia show, p. 274

The Effects of Air Pollution on Plant Life. (USDA Slide Set), p. 134

Ault, Clem, tree farmer (Oreg.), pp. 252–253

Automatic data processing of soil survey manuscripts (Tex.), p. 92

Baker, W. Barry: *Soil surveys—a base for building codes*, pp. 264–265

Barnes, R. C., Jr.: Review of *Soil Conservation*, p. 38

Barrons of Ox-Shoe Ranch. Warren W. Brown, pp. 242–243

Bartelli, Lindo J.: *Courting the computer, automation in the soil survey program*, pp. 92–93

Baumann, Edgar: *Fun—far from the crowds*, pp. 152–153

Beaty, Albert E.: *Camille was no lady—in West Virginia*, pp. 7–9, 11

BEAUTIFICATION—

reforestation and wildlife packet program (Ohio), p. 55

Beene, J. T.: *Horses win, tractors lose*. With W. J. Sauerwein, pp. 252–253

Berg, Norman A.: *Look at the land first*, pp. 214–215

Betts, Lynn A.—

Iowa farmers and soil erosion, pp. 190–191

Paradise Valley, a land for people. With Sylvan T. Runkel, pp. 36–37

Beyond figures. Kenneth E. Grant, p. 160

Big sky classroom. Dan F. Croom, p. 203

Birdwell, Bobby T.: *Local money accelerates soil surveys in North Carolina*, pp. 107–108

Bowald, Earl, tillage (Ill.), p. 44

Boy power in conservation. Laurence A. Arpin, pp. 128–130

BOY SCOUTS, save sand dune islands, Potholes Reservoir (Wash), p. 129

BRAZIL—

soil and water program progress, p. 3

soil surveys, p. 16

Brewer, Rear Admiral James, rural adviser (N.H.), p. 156

Briggs, Shirley A.: Editor, *Landscaping for Birds*, p. 255

Bring back the grass. Carl Wilker, pp. 72–73

Bringing back prosperity. Jerry D. Schwein, pp. 246–247

Brown, Berlyn: *Organic trees*. With Charles Foster, p. 108

Brown, Warren W.: *The Barrons of Ox-Shoe Ranch*, pp. 242–243

Buena Vista is looking better. A. Bertram Hawkins, p. 104

Builder's code for conserving natural resources, p. 217

Building codes, developed to meet soil problems (Ohio), p. 264

Bullard Gary: *Wood ducks flock to flooded woods*, pp. 176–177

Bureau of Outdoor Recreation, cooperation in development of nationwide outdoor recreation plan, p. 238

Bury, Richard L.: *Recreation: a new industry for the Great Plains?* With Billy A. Hardman and Robert E. Wagner, pp. 259–261

Busek, Ernest A.: *Grounds for grouse*, pp. 169–170

By any other name. . . Kenneth E. Grant, p. 280

- CALIFORNIA—
 flood insurance, p. 50
 Lake Tahoe, Regional Planning Agency, land capability districts, p. 228
 Lockeford Plant Materials Center serves all of California and part of Nevada, p. 180
 Pleasanton Plant Materials Center, grasses and shrubs for highway banks and low, hilly, and mountainous areas, p. 86
 Rio Grande wild turkeys, p. 167
 clay soil damages house, p. 106
Camille was no lady—in Virginia. Warren G. Friend, pp. 7–10
Camille was no lady—in West Virginia. Albert E. Beaty, pp. 7–9, 11
Camping is big business, p. 193
 Canterbury, James H.: *Channelization—the farmer's friend*, pp. 23–24
 Carr, John P.: *Living high in Appalachia*. With Robert A. Speich, pp. 96–97
 Cattle, farmers' beef on rural vacationing properties (Va.), p. 194
 CHANNEL(S)—
 improvement on ground water, Swift Creek watershed, Creeping Swamp (N.C.), p. 59
 improvement of low coastal areas because of Mill Creek watershed (Ga.), p. 232
 improvement, hurricane (Va.), p. 32
 CHANNELIZATION—
 Dismal Swamp Canal (N.C., Va.), p. 23
 of streams, an interview, p. 19
 —*the farmer's friend*. James H. Canterbury, pp. 23–24
Chemical tolerant switchgrass to help control water pollution. Donald C. Smith, p. 78
 Chiseled field (Ill.). Cover photograph, p. 41
 Civilian Conservation Corps, built cabin (Oreg.), p. 153
 Clevenger, Jim, conservationist (W. Va.), p. 126
 Cobabe, Alvin, ski resort manager (Utah), p. 155
 COLORADO—
 Denver Urban Renewal Authority, municipal waste disposal system, p. 123
 Division of Wildlife and Colorado State Forest Service, furnishes men, funds, and labor for planting stock for wildlife area, pp. 248–249
 new schoolhouse (paid for by taxes) buckles because of unstable soils, p. 225
 Columbia Basin farmers put aside acres of uplands and wetlands for wildlife (Wash.), pp. 266–267
 COMPUTER(S)—
 for soil survey manuscripts (Tex.), p. 92
 soil data, p. 140
 Conlin, Brent: *Water 365 days a year*. With Jay M. Hall, p. 199
 CONSERVATION—
 and beef cow-calf project on 18 farms (Mich.), p. 57
 and recreation sites. Charles G. Phillips, pp. 268–270, 276
breaks cotton cycle. Atif Atilla and S. H. Fuchs, pp. 12–13
camp. Cynthia Gleason, pp. 48–49
 help for local governments, progress, fiscal 1972, p. 141
in action, pp. 58–60, 107–108, 202–203, 274–276
 needs and guide for land used for recreation, pp. 268–270, 276
 Needs Inventory, statistics, p. 212
 practices triple production on vacation farm (W. Va.), p. 245
 practices utilized to control erosion on motorcycle farm (Pa.), p. 263
 progress, fiscal 1972, pp. 139–146
 tillage (Ill.), p. 43
 Cooperative Extension Service—
 beef cow-calf operation (Mich.), p. 57
 conservation tillage, cost sharing (Ill.), p. 43
 Corbitt, J. S.: *Living is easier*, p. 60
 Core, W. R., and Gary, cutover land to recreation (La.), p. 192
 Corps of Engineers, U.S. Army, flood plain data (Nev.-Calif.), p. 228
 Council of State Governments, pp. 116–119
Courting the computer, automation in the soil survey program. Lindo J. Bartelli, pp. 92–93
Cover for bare ski slopes. James A. Weston, pp. 154–155
 Cox, Cal: *Terraces in town*, p. 105
 Crews, R. V., water (Ala.), p. 46
 Croeni, Kenneth: *A new plant materials center*, p. 180
 Croom, Dan F.: *Big sky classroom*, p. 203
 Crop(s), paddy, wild rice (Minn.), p. 187
 Cropland(s), channelization, p. 19
 DAM(S)—
 and reservoir, Montpelier Creek, flood control (Idaho), p. 33
 hurricane (Md., Pa., N.Y., Del., Va.), pp. 28–32
in time saves and saves and saves. John S. Taggart, p. 33
 Matejcek Dam (N. Dak.), p. 241
 Thompson Creek watershed, wildlife and camping (N.Y.), p. 60
decade of international cooperation. Joseph B. Rogers, pp. 3–6, 14–15
deer project. James H. Griffin, p. 179
 DELAWARE, upper Choptank River watershed, dams protect from hurricane, p. 31
 Delia, Frank, mayor (La.), p. 230
 DISTRICT(S)—
 conservationists work on all phases of conservation, p. 64
 Tahoe-Verdi Soil Conservation District meets resource challenges (Nev.), pp. 272–273
Dream house becomes haunted house. Donald L. Lucas, p. 106
dwarf goes Hawaiian. Vincent J. Price, pp. 82–83
 Eckles, Ray, recreation (Oreg.), p. 152
 Economic Research Service, river basin studies, p. 142
 ECONOMIC(S)—
 Beltrami County, wild rice paddies help equipment dealers, railroad shipping, and local economy (Miss.), p. 188
 Elizabethtown, water (Ky.), pp. 25–27
 income from campsite for outdoor education (Okla.), p. 203
 Jumping Branch, Nimitz, Mountain-Dominion RC&D Project (W. Va.), p. 97
 leisure boom in 1972, p. 235
 Montpelier Creek watershed, flood control (Idaho), p. 33
 new plants and grasses for cover (Wash., Miss., Tex., Md., N.Y.), pp. 67–70
of new plants. Vincent Price, pp. 67–70
 recreation developments bring new industries and tourists and strengthens economy (Colo.), p. 246
 strip-mining land reclamation, costs (Wyo.), p. 198
 ECUADOR, soil and water program, pp. 3–4
 Edmunson, George: *Plants for California highways*, p. 86
 EDUCATION—
 ecology hikes on mountain ranch (Mo.), p. 150
 Girls' Conservation Camp (Wis.), p. 48
 nature trails (N.H.), p. 202
 trails for handicapped and others (Mass.), p. 53
Effect of channel improvement on ground water studies. Frank H. Jeter, p. 59
 Elliott, J. G., mayor (La.), p. 223
Emerald Sea—a new shore juniper. H. W. Everett, pp. 76–77
 Emergency Preparedness, Office of—
 paid for cleanup work. Hurricane Camille (W. Va.), p. 11
 paid for debris removal. Hurricane Camille (Va.), p. 10

ENVIRONMENT—

- annual report, fiscal 1972, pp. 139–146
- channelization, p. 21
- concerns in conservation planning*. Charles G. Phillips, pp. 120–122
- Girls' Conservation Camp (Wis.), p. 48
- interconnecting trails for handicapped and others (Mass.), p. 53
- interview with Jean Packard, Fairfax County (Va.), p. 218
- Lake Tahoe basin (Nev.-Calif.), p. 229
- land resource planning by conservation districts, p. 227
- land use planning, p. 214
- national land use policies, p. 211
- new plants and grasses for cover, pp. 67–70
- Plant Materials Center's grasses, legumes, forbs, and woody plants (Kans.), p. 79
- protection for sage grouse and other wildlife (Wash.), p. 169
- quality for world, UN agency, p. 16
- stream channelization (N.C.), p. 23
- wildlife on converted desert land (N.C.), p. 174
- Environmental Protection Agency, U.S.—
 - conferences, p. 115
 - model sediment control law, p. 116
 - requirements following by canning company (Ill.), p. 203
- Epling, Larry, conservation law (Iowa), p. 190
- Equipment, grass seed stripper for hard-to-harvest grasses (Tex.), p. 80
- Everett, H. W.: *Emerald Sea—a new shore juniper*, pp. 76–77

Faggioli, Richard, wild turkeys (Calif.), p. 167

FARMER(S)—

- rancher help to wildlife grows*, p. 191
- Farmers Home Administration—
 - aid and assistance to the Great Plains project sponsors and farmers for income-producing outdoor recreation enterprises, p. 260
 - cost shares water system (W. Va.), p. 97
 - finances house on clay soil (Calif.), p. 106
- Federal Highway Administration, issues standards for federal highway construction, p. 118
- Federal Insurance Administration, flood insurance (Calif.), p. 50

Fish(es), channelization, p. 21

Fleming, Rose C.: *Welcome, ducks!* p. 178

Fleming, Rosemary, naturalist (Wis.), p. 48

FLOOD(S)—

- control by Montpelier Creek watershed (Idaho), p. 33
- control, hurricane (Md., Pa., N.Y., Del., Va.), pp. 28–32
- Cromline Creek watershed (N.Y.), p. 148
- damage, p. 214
- Elizabethtown now protected (Ky.), p. 26
- hazard areas, insurance, progress, fiscal 1972, pp. 142–143
- Hurricane Camille, damage (Va.), p. 7
- Hurricane Camille, damage (W. Va.), p. 7
- insurance (Calif.), p. 50
- marsh, canal, and sugarcane protection (La.), p. 34
- prevention, Mountain Dominion RC&D Project (W. Va.), p. 97
- stream channel improvement (N.C.), p. 24
- upstream dams reduce flood damage (Colo.), p. 275

For conservation's sake—and retirement. Albert Howard, pp. 150–151

For-Mar Nature Preserve and Arboretum, 285-acre nature center (Mich.), pp. 250–251

forb in your future. Dale D. Allen, p. 71

FOREIGN ASSISTANCE—

- by SCS and Agency of International Development in Algeria,

Brazil, Ecuador, India, Nicaragua, Nigeria, Senegal, Thailand, Tunisia, Turkey, Vietnam, Zambia, pp. 3–6, 12–16

progress, fiscal 1972, p. 144

Forest Service, U.S.—

ducks (Miss.), p. 178

Lake Tahoe (Nev.-Calif.), p. 229

Old Buck Creek Cabin (Oreg.), p. 152

optimum water level (Ga.), p. 232

provides recreation opportunities on grasslands and forests in Great Plains, p. 260

river basin studies, p. 142

Foster, Charles: *Organic trees*. With Berlyn Brown, p. 108

Framework plan, progress, fiscal 1972, p. 144

Friend, Warren G.: *Camille was no lady—in Virginia*, pp. 7–10

From the ground up. Gene Warren, pp. 230, 223

Fuchs, S. H.: *Conservation breaks cotton cycle*. With Atif Atilla, pp. 12–13

Fun—far from the crowds. Edgar Baumann, pp. 152–153

Geological Survey, U.S.—

ground water channel improvement study (N.C.), p. 59

surface mine spoil, p. 70

GEORGIA, multipurpose lake (Dawsonville), cover photograph, p. 233

Gillespie, Morris S.—

Runoff goes underground, pp. 46–47

ground's the limit, pp. 98–99

This industry is rated "X"—for "excellent", pp. 239–241

GIRL SCOUT(S), save sand dune island (Wash.), p. 129

Gleason, Cynthia: *Conservation camp*, pp. 48–49

Grace, Patrick W.: *We care about birds*. With David N. Allan, pp. 171–173

Grant, Kenneth E.—

Beyond figures, p. 160

By any other name. . ., p. 280

Land use: Past and Present, pp. 211–213, 219

More work less emotion, p. 115

Putting it all together, p. 64

The regreening of America, p. 207

The outdoor recreation "crop" is growing, p. 256

The role of channels in total water management. An interview, pp. 19–22

The search goes on, p. 88

Wherever we can help, p. 16

While the iron is hot, p. 91

Wildlife rates the best we can give, p. 184

GRASS(ES)—

and crops on mountain ranch (Mo.), p. 150

and forbs replacing sagebrush and juniper (Utah), p. 73

and Lana vetch for wild turkeys on ranch (Calif.), p. 168

and other plants for highway construction and for Navy Auxiliary Air Station (Nev.), p. 74

and other seaside plants on landfill area (Maine), p. 171

on Bowie Exchange Freeway overpass (Ariz.), p. 84

fescue, rye, and orchardgrass seeded to minimize erosion and sedimentation on private recreation areas (Ill.), pp. 246–247

for bare ski slopes on resorts (Utah), p. 155

for strip-mined areas (W. Va.), p. 126

'Garrison' creeping foxtail, 'Elsberry' smooth brome grass, 'Toreed' reed canarygrass, 'Blackwell' switchgrass tested at plant materials center for herbicide tolerance (Mo.), p. 78

'Latar' orchardgrass (Wash.), Cover photograph, p. 66

'Latar' orchardgrass developed by Pullman Plant Materials Center (Wash.), p. 67

'Meechee' arrowleaf clover by Coffeeville Plant Materials Center (Miss.), p. 68

- mixture for restoration, Hurricane Camille (Va.), p. 10
- Plant Materials Center, 'Bend' sand lovegrass, 'Barton' wheatgrass, other grasses, forbs, and woody plants for pollution control, erosion control, and grazing (Kans.), p. 79
- Plant Materials Center tests dwarf pangolagrass on highway (Hawaii), p. 82
- Pleasanton Plant Materials Center, testing for highways and low, hilly, and mountainous areas (Calif.), p. 86
- progress, fiscal 1972, p. 140
- replace gullies on land restored to wildlife (N.C.), p. 174
- seed stripper under scrutiny*. Dale D. Allen, pp. 80-81
- seeding banks, Hurricane Camille (W. Va.), p. 11
- Selection, 75 kleingrass developed by Knox City Plant Materials Center (Tex.), p. 68
- wheat, needlegrass, and saltbush for reclaiming strip-mined land (Wyo.), p. 198
- wild rice (Minn.), p. 187
- Grazing, grasses (Kans.), p. 79
- GREAT PLAINS CONSERVATION PROGRAM—
- progress, fiscal 1972, pp. 143-144
- statistics, p. 212
- Recreation: a new industry for the Great Plains?* Richard L. Bury, Billy H. Hardman, and Robert E. Wagner, pp. 259-261
- Greentree reservoir for waterfowl habitat (Okla.), p. 176
- Griffin, James H.: *A deer project*, p. 179
- Ground water-channel improvement study (N.C.), p. 59
- Grounds for grouse*. Ernest A. Busek, pp. 169-170
- ground's the limit*. Morris S. Gillespie, pp. 98-99
- Grow your own steak?*, p. 194
- Guidelines for tomorrow*. Vincent J. Price, pp. 147-149
- Hall, Jay M.: *Water 365 days a year*. With Brent Collin, p. 199
- Hall, Simeon, Jr., farmer and farm-equipment dealer (W. Va.), p. 126
- Hamor, Wade H.: *Home on the range—for elk and buffalo and Texas longhorns*, pp. 163-166
- Hanson, Ruth: *A package deal*. With Fred Kekko, pp. 56-57
- Hardman, Billy H.: *Recreation: a new industry for the Great Plains?* With Richard L. Bury and Robert E. Wagner, pp. 259-261
- Hassell, Wendell G.: *Plants have it rough in Arizona*, pp. 84-85
- Hauck, William R.: *So you want to live in the country*, pp. 156-157
- HAWAII, Plant Materials Center tests dwarf pangolagrass on highway, p. 83
- Hawkins, A. Bertram: *Buena Vista is looking better*, p. 104
- Hawkins, James, soil loss limit regulations (Iowa), p. 190
- Heal, Ruth Keister: *How a conservation plan started a vacation farm*, pp. 244-245
- Help yourself*. Richard L. Thompson, p. 133
- HERBICIDE(S), used for testing grass tolerance (Mo.), p. 78
- Herring, Hugh, mayor (Ala.), p. 240
- Higgins, Harold, soil loss limit regulations (Iowa), p. 191
- HIGHWAY(S)—
- dwarf pangolagrass tested (Hawaii), p. 83
- grasses for overpasses (Ariz.), p. 84
- roadbank construction plantings (Nev.), p. 75
- roadbanks stabilized by 'Cardinal' autumn-olive and 'Arnot' bristly locust (Md., N.Y.), pp. 69-70
- Holbrook, Edward, naturalist (Ky.), p. 108
- Hollowell, Roy (N.C.), p. 23
- Home on the range—for elk and buffalo and Texas longhorns*. Wade H. Hamor, pp. 163-166
- Horses win, tractors lose*. J. T. Beene and J. W. Sauerwein, pp. 252-253
- Housing and Urban Development, U.S. Department of,—
- cost-shared water system (Kans.), p. 58
- flood insurance (Calif.), p. 50
- site planning assistance (Ala.), p. 98
- How a conservation plan started a vacation farm*. Ruth Keister Heal, pp. 244-245
- Howard, Albert: *For conservation's sake—and retirement*, pp. 150-151
- Hulsey, Joe, Jr.: Cover photograph, (Cummins, Ga.), p. 233
- Hunting Allowed!* Robert Tully and Eldie Mustard, pp. 248-249
- Hurricane Agnes reigned—and rained*. pp. 28-32
- IDAHO—
- Box Elder, Oneida and Cache RC&D Project, Malad, new conservation structure and ditch for irrigation, p. 199
- Montpelier Creek Reservoir and watershed dam for flood control, p. 33
- ILLINOIS—
- canning company, sprinkler system controls pollution problem, p. 203
- Chicago, sanitary district storm-water detention facilities, p. 123
- chiseled field. Cover photograph, p. 41
- field days set*. p. 275
- minimum (conservation) tillage, Conservation Practices Committee, Woodford County, p. 43
- INDIA—
- farmworkers. Cover photograph, p. 1
- soil and water program, progress, p. 4-6
- Indian Affairs, Bureau of, grants for paddy wild rice (Minn.), p. 189
- Indian(s)—
- Red Lake Reservation, Chippewa, paddy wild rice (Minn.), p. 189
- Sioux, Rosebud Reservation (S. Dak.), p. 163
- Insurance, flood (Calif.), p. 50
- INTERVIEW(S)—
- channelization, p. 19
- Jean Packard, Fairfax County (Va.), p. 218
- William E. Richards, land use planning (Nebr.), p. 222
- IOWA—
- Conservancy District Act, first statewide mandatory soil loss limit regulations, p. 190
- Council Bluffs, Horizon Hills on sugar clay soils, tile intake terraces, p. 105
- farm converted to recreation enterprise, fishing, trails, p. 36
- farmers and soil erosion*. Lynn Betts, pp. 190-191
- soil conservation law in action, p. 190
- soil loss limits, p. 207
- statistical laboratory stores interpretation data for soil series. p. 93
- IRRIGATION—
- company controls flood waters (Idaho), p. 33
- siphons and land leveling on farm change from cotton to wheat (Turkey), p. 12
- sprinkler system (Ill.), p. 203
- water for Deep Creek Irrigation Co., Malad (Idaho), p. 199
- It's not nice to fool with Mother Nature*. Charles L. Rowan, pp. 195-197
- Jacobson, Erling T.: *Nature's own pollution control device*, p. 79
- Jahn, Bert J.: *This land is not for wasting*, pp. 266-267
- Jaquish, Orin W.: *Motorcycle farm*. With Jeffrey R. Loser, pp. 262-263
- Jeter, Frank H.: *Effect of channel improvement on ground water studied*, p. 59

Jump, Lewis H.: *Woodland—less is more*, p. 202

KANSAS—

Governor's Conference on Sediment Control; legislation, p. 116–119

Plant Materials Center grasses, legumes, forbs, and woody plants to control pollution, 'Bend' sand lovegrass for planned grazing, p. 79

Timber Creek watershed, Winfield floodwater storage reservoirs and city water and recreation, p. 58

Kekko, Fred: *A package deal*. With Ruth Hanson, pp. 56–57

Keller, S. H.: *Water—to have and to hold*, p. 58

Kelley, Hubert: *The role of channels in total water management*. An interview with Kenneth E. Grant, pp. 19–22

Kennell, Bob, (Ill.), p. 44

KENTUCKY—

city generates prosperity with water. Gordon S. Smith, pp. 25–27

naturalist practices woodland conservation without chemicals, p. 108

Klein, Leland, (Ill.), p. 44

Lake Tahoe Regional Planning Agency (Nev.-Calif.), p. 228

Lake Thunderhead, camping areas (Mo.) Cover photograph, p. 17

LAND—

and water planning go together, pp. 231–232

capability districts (Nev.-Calif.), p. 228

capability maps, Lake Tahoe (Nev.-Calif.), p. 229

leveling and siphon irrigation change farm from cotton to wheat (Turkey), p. 12

misuse prevented by good land use planning, pp. 214–215

problems with the American land—pollution, misuse, dirty water, wastes, p. 220

reclamation, Hurricane Camille (Va.), p. 11

reclamation, Hurricane Camille (W. Va.), p. 11

resource ownership distribution, p. 214

Land Management, U.S., Bureau of, chained and reseeded parts of Sevier River Basin (Utah), p. 73

LAND USE(S)—

A most unusual district, pp. 272–273

farmland on college property converted to recreation area (Miss.), pp. 275–276

good planning, p. 225

national policy history, p. 211

past and present. Kenneth E. Grant, pp. 211–213, 219

planning from soil surveys (La.), p. 230

planning hits home, pp. 224–225

planning initiated by conservation districts, p. 227

planning on watershed projects (Va., Ga., Pa.), p. 231–232

planning viewpoints, pp. 216–217

poor planning, p. 224

shift from farm to park (Va.), p. 104

Landfill(s), area for wildlife (Maine), p. 171

Landscaping for Birds. Edited by Shirley A. Briggs, reviewed by Vee E. Weggel, p. 255

Law in Action, p. 190

Lee, George, resource conservationist (N.Y.), p. 107

Living high in Appalachia. Robert A. Speich and John P. Carr, pp. 96–97

Living is easier. J. S. Corbitt, p. 60

Local money accelerates soil surveys in North Carolina. Bobby T. Birdwell, pp. 107–108

Logging operation (Oreg.) uses horses as hedge against pollution and damage to trees and land, pp. 252–253

Look at the land first. Norman A. Berg, pp. 214–215

Loser, Jeffrey R.: *Motorcycle farm*. With Orin W. Jaquish, pp. 262–263

LOUISIANA—

Coushatta, Newellton sewage lagoon, p. 131

Lower Bayou Teche watershed, marsh and canal protection, sugarcane water, floods, p. 34

New Orleans, Lake Ramsay Recreation Area, recreation "supermarket," p. 192

Springhill, DeRidder, New Orleans, Shreveport, Farmersville wants soil surveys for good land use planning, pp. 230, 223

Lucas, Donald L.: *Dream house becomes haunted house*, p. 106

MAINE, threshold of Maine RC&D Project, landfill for wildlife use—terns and other birds, p. 171

Malo, John W.: *Wilderness Canoeing*, p. 87

Mangum, Jimmy: *Recreation supermarket for big city appetites*. With Carl V. Thompson, Jr., pp. 192–193

MARYLAND—

'Cardinal' autumn-olive by National Plant Materials Center (Md.), p. 68

Cartographic Unit, Advanced Mapping System, p. 93

Columbia, good land use planning, p. 226

'Emerald Sea' for landscape use and shore plantings, p. 77

Montgomery County, storm-water management because of urbanization; Sediment Control Law, p. 123

ponds in residential development. Cover photograph, p. 113

rooftop and parking lot water storage; underground storage, ponds, p. 124

sediment control law, p. 118

MASSACHUSETTS—

special interconnecting trails for handicapped and others, p. 53

McGrath, George E., Jr.: *Presenting... the soil survey*, pp. 94–95

Menezes, Frank J., Jr.: *New game bird takes to California—and to strangers*, pp. 167–168

MICHIGAN—

Covington and Watton, beef cow-calf project with conservation practices on 18 farms, p. 56

Detroit, water main in deep peat soils adds extra costs, p. 224–225

educational meetings on sediment control, p. 116

Minimum tillage: looks like a winner. Vincent J. Price, pp. 43–45

MINNESOTA—

Beltrami County, Manomin Development Co., "wild rice" paddies, p. 187

housing plan includes ponds, park, tree shelterbelt, p. 226

Jonathan, good land use planning, p. 226

sediment institutes, p. 116

wild rice, habitat for wildlife, p. 207

MISSISSIPPI—

'Meechee' arrowleaf clover by Coffeeville Plant Materials Center, p. 68

nesting boxes, beaver ponds converted for ducks, flood control and mudflats, p. 178

MISSOURI—

Mt. Finley, ecology hikes, hunting, crops, grasses, wildlife, p. 150

Plant Materials Center trials of switchgrass and other grasses tested for herbicide tolerance, p. 78

recreation, Lake Thunderhead. Cover photograph, p. 17

Moldenhauer, Alan, offer originates wildlife management program, p. 248

MONTANA—

- Bear Paw Lake, Cover picture, p. 258
- sediment institutes, p. 116
- More Work less emotion.* Kenneth E. Grant, p. 115
- most unusual district.* Leonard A. Anker, pp. 272–273
- Motorcycle farm.* Orin W. Jaquish and Jeffrey R. Loser, pp. 262–263
- Mustard, Eldie: *Hunting Allowed!* With Robert Tully, pp. 248–249

- Naphan, E. A.: *Reconnaissance soil surveys aid planning in Nevada.* With F. F. Peterson and B. J. Vasey, pp. 100–103
- National Aeronautics and Space Administration, infrared and black-and-white aerial photographs (Ala.), p. 98
- NACD, recreation appraisal system, pp. 235–236
- National Audubon Society, prepared survey report and outdoor education plan for nature center (Mich.), p. 250
- National Conference on Land Utilization, p. 212
- National Conference on Sediment Control, p. 116
- National forests, p. 211
- Nature on exhibit.* Carl R. Stamm, pp. 250–251
- Nature's own pollution control device.* Erling T. Jacobson, p. 79

NEBRASKA—

- Douglas Soil and Water Conservation District builder's code, p. 217
- Fort Niobrara, refuge for elk, buffalo, and Texas longhorns, p. 163
- landfill from gravel pits, p. 40
- William E. Richards, banker and rancher, interview on land use planning, pp. 222–223
- Neighborhood Youth Corps helps build Glen Maury Park (Va.), p. 104
- Nelson, B.C., Jr., city manager (Va.), p. 104

NEVADA—

- Lake Tahoe, Regional Planning Agency, land capability districts, p. 228
- plantings for highway construction, Navy Auxiliary Air Station and Lake Tahoe, p. 75
- reconnaissance soil surveys needed for most of Nevada's land and for urban expansion, p. 100
- new crops for the North Country.* Vincent J. Price, pp. 187–189, 201
- New game bird takes to California—and to strangers.* Frank J. Menezes, Jr., pp. 167–168

NEW HAMPSHIRE—

- North Country RC&D Project, nature trails, p. 202
- North Country RC&D Project, Piermont, land use ordinances for urbanization, p. 156

NEW JERSEY—

- 'Emerald Sea' for landscape use and shore plantings, p. 77
- new look at sediment control.* David G. Unger, pp. 116–119
- new plant materials center.* Kenneth Croeni, p. 180
- New town on Matejcek Dam.* p. 241

NEW YORK—

- 'Arnot' bristly locust by Big Flats Plant Materials Center stabilizes mine spoil areas and roadbanks, p. 70
- Chatham, farm pond for youth program, p. 59
- guidelines for Cromline Creek watershed, flooding and pollution, recreation, wildlife, farming, woodland, p. 147
- miscalculation in depth to bedrock increases sewer system costs, p. 225
- Nanticoke, Deer, Conewango Creeks, dams, hurricane, p. 30
- sediment control law, p. 118
- Westchester County helps pay for soil survey, p. 107
- Nicaragua, soil and water program, p. 6

Nigeria, soil and water program, p. 6

NORTH CAROLINA—

- Cumberland, Hoke, and Mecklenburg Counties help pay for soil surveys, p. 108
- Hackney Deer Restoration Project by 44 landowners, wooded flood plain for deer and other wildlife, p. 179
- Randolph County, from desert to land for wildlife, p. 174
- stream channelization, coastal plains, Dismal Swamp, p. 23
- Swift Creek watershed, Creeping Swamp, channel improvement on ground water study, p. 59
- Not-so-instant landfill,* p. 40

Oberwager, David: *After coal what?* pp. 198–199

OHIO—

- seedling packet program for trees reforestation, wildlife, and beautification, p. 55
- sediment control law, p. 118

OKLAHOMA—

- Big Lake Club of Tulsa, lake and greentree reservoir for wood ducks and a waterfowl habitat, p. 176
- outdoor classroom on church campsite, p. 203
- sediment institutes, p. 116
- Olympic-size pond.* John C. Titchner, pp. 59–60
- On the strip mining front: achievement in the trenches.* Laurence A. Arpin, pp. 126–127
- Ooms, Arend, conservation award (N.Y.), p. 59
- Optimist in Suburbia,* pp. 218–219

OREGON—

- Columbia Blue Mountain RC&D Project, ponds, crops, recreation via leases, wildlife, fish farm, hot springs, p. 152
- sediment institutes, p. 116
- Organic trees.* Berlyn Brown and Charles Foster, p. 108
- Orvedal, Arnold C.: *Review of Compaction of Agricultural Soils,* p. 109
- Osborn, Frank R., canning company (Ill.), p. 203
- outdoor recreation "crop" is growing.* Kenneth E. Grant, p. 256

Package deal. Fred Kekko and Ruth Hanson, pp. 56–57

- Packard, Jean, interview (Va.), p. 218
- Palk, Roy: *They're young, concerned, and active,* p. 271
- Paradise Valley, a land for people.* Sylvan T. Runkel and Lynn A. Betts, pp. 36–37

PASTURE(S)—

- for beef cow-calf project on 18 farms (Mich.), p. 57
- Patty, Duncan, wild turkeys (Calif.), p. 167

PENNSYLVANIA—

- Delaware County, soil and water problem, p. 224
- Hurricane Agnes, dams held back water, p. 141
- Mauch Chunk, Marsh Creek watersheds, dams, hurricanes, p. 30

People involvement, p. 64

Perrott, C. E.: *And on the farm there was a golf course,* pp. 275–276

Peterson, F. F.: *Reconnaissance soil surveys aid planning in Nevada.* With E. A. Naphan and B. J. Vasey, pp. 100–103

- Phillips, Charles G.—
- Conservation and recreation sites,* pp. 268–270, 276
- Environmental concerns in conservation planning,* pp. 120–122

PLANT(S)—

- a pack of packeted plants.* Fred G. Aten, p. 55
- 'Arnot' bristly locust developed at Big Flats Plant Materials Center stabilizes mine spoil area and highway roadbanks (N.Y.), p. 70
- 'Cardinal' autumn-olive developed by National Plant Materials Center, stabilizes surface-mined land (Md.), p. 68

- for California highways. George Edmunson, p. 86
forbs being developed by Knox City Plant Materials Center (Tex.), p. 71
grasses, legumes, forbs, and woody plants to control pollution and for grazing (Kans.), p. 79
have it rough in Arizona. Wendell G. Hassell, pp. 84-85
Lockeford Plant Materials Center (Calif.), p. 180
materials centers, p. 88
new forage plants for cover (Wash., Miss., Tex., Md., N.Y.), pp. 67-70
nutrients as pollutants, p. 121
progress, fiscal 1972, p. 140
reforestation, wildlife, and beautification packet program, trees and shrubs (Ohio), p. 55
Tucson Plant Materials Center testing grasses for overpasses (Ariz.), p. 84
Planting(s)—
'Emerald Sea' for landscape use and shore plantings (Md., N.J.), p. 77
POLLUTION—
agricultural related pollutants and sediments from non-agricultural sources; plant materials, animal wastes, p. 120
control by grasses (Kans.), p. 79
control, sprinkler system and plot of ground, canning company (Ill.), p. 203
POND(S)—
and flooded areas for wildlife, hunting (Oreg.), p. 152
for beef cow-calf project on 18 farms (Mich.), p. 57
for summer youth program on farm (N.Y.), p. 59
onsite storage of water (Md.), p. 124
revamped for swimming and fishing (Iowa), p. 36
sediment collecting ponds in a strip-mined area (W. Va.), p. 126
watering for wildlife on mountain ranch (Mo.), p. 150
Presenting... the soil survey. George E. McGrath, Jr., pp. 94-95
Price, Vincent J.—
A new crop for the North Country, pp. 187-189, 201
Guidelines for tomorrow, pp. 147-149
Minimum tillage: looks like a winner, pp. 43-45
Review, review, review, p. 107
Storm water hold it! pp. 123-125
The dwarf goes Hawaiian, pp. 82-83
The economics of new plants, pp. 67-70
Private landowners provide land for wildlife habitat development and hunting, p. 248
Putting it all together. Kenneth E. Grant, p. 64
Rancher's view of land planning, pp. 222-223
Range, management for Fort Niobrara wildlife refuge (Nebr.), p. 164
RANGELAND(S)—
cutover to recreation (La.), p. 192
interview with William E. Richards on land use planning (Nebr.), p. 222
Rasmussen, Wayne L., and Gladys L. Baker: *The Department of Agriculture*, p. 62
Reclamation, U.S. Bureau of, O'Sullivan Dam (Wash.), p. 129
Reconnaissance soil surveys aid planning in Nevada. F. F. Peterson, E. A. Naphan, and B. J. Vasey, pp. 100-103
RECREATION—
a new industry for the Great Plains? Richard L. Bury, Billy H. Hardman, and Robert E. Wagner, pp. 259-261
And on the farm there was a golf course, pp. 275-276
—as big as all outdoors. Dr. Darnell M. Whitt, pp. 235-238
camping, p. 193
camping, Lake Thunderhead. Cover picture (Mo.), p. 17
Conservation and recreation sites, pp. 268-270, 276
Cromline Creek watershed (N.Y.), p. 148
Elizabethtown, Freeman Lake Recreation Area, multiple purpose dam; public park (Ky.), p. 26
enterprise converted from farmland, fishing, trails (Iowa), p. 36
from farmland to Glen Maury Park (Va.), p. 104
future campgrounds for added income (Wash.), p. 202
Girls' Conservation Camp (Wis.), p. 48
golfing and fishing on company grounds (Ala.), pp. 239-241
grasses on bare ski slopes (Oreg.), p. 155
hunting and fishing on mountain ranch (Mo.), p. 150
hunting of waterfowl from wild rice paddies (Minn.), p. 201
hunting on flood control structure and converted beaver ponds for ducks (Miss.), p. 178
hunting on natural lake (Okla.), p. 176
hunting on private land, p. 184
ice fishing on Matejcek Dam (N. Dak.), p. 241
marsh and canal protection (La.), p. 34
Motorcycle farm (Pa.), pp. 262-263
New Orleans, Lake Ramsay Recreation Area, outdoor (La.), p. 192
open-hunting territory (Colo.), pp. 248-249
private ponds, flooded areas for hunting, fish farm, leases, state park, Lehman Hot Springs, youth recreation by Kiwanis Club (Oreg.), p. 152
ranch, offers fishing, picnicking, nature trails, bridle paths and a rodeo (Calif.), pp. 242-243
supermarket for big city appetites. Carl V. Thompson, Jr., and Jimmy Mangum, pp. 192-193
Thompson Creek watershed dams, Boy and Girl Scouts camping (Tenn.), p. 60
Timber Creek watershed, Winfield floodwater reservoirs (Kans.), p. 58
vacation farm (W. Va.), pp. 244-245
Regreening of America. Kenneth E. Grant, p. 207
Rend Lake (Ill.), abundant water supply and recreation opportunities, p. 246
RESOURCE(S)—
conservation assistance progress, fiscal 1972, p. 140
technology development, progress, fiscal 1972, p. 139
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT(S)—
Box Elder, Oneida and Cache, new conservation structure and ditch for irrigation (Idaho), p. 199
Columbia-Blue Mountain, private recreation (Oreg.), p. 152
Mountain-Dominion, Jumping Branch, Nimitz, flood prevention and municipal water supply (W. Va.), p. 97
North Country, nature trails (N.H.), p. 202
North Country, Piermont, resources and land use ordinances (N.H.), p. 156
outdoor recreation popular project measure, p. 238
Threshold of Maine, wildlife on landfill area (Maine), p. 171
Western Wyoming, sanitary landfill and cemetery improvement (Wyo.), p. 133
Review, review, review. Vincent J. Price, p. 107
REVIEWS—
Compaction of Agricultural Soils. By American Society of Agricultural Engineers, p. 109
Erosion and Sediment Pollution Control. By R. P. Beasley, p. 38
Landscaping for Birds. 1973. Edited by Shirley A. Briggs, p. 255
Soil Conservation. By Norman Hudson, p. 38
The Careless Technology, 1972. Edited by M. Taghi Farvar and John P. Milton, p. 38
Wilderness Canoeing. By John W. Malo, p. 87
Rice, wild (Minn.), p. 207

Richards, William E., interview (Nebr.), p. 222

Ritter, Norman R.: *Winners in Nevada—the motorists*, pp. 74–75

Ritzer, Henry J.: *They touch the environment*, pp. 52–54

RIVER BASIN, progress, fiscal 1972, p. 142

Rivera, Romeo A.: *SCS conducts flood insurance studies for HUD*, pp. 50–51

Rogers, Joseph B.: *A decade of international cooperation*, pp. 3–6, 14–15

role of channels in total water management. An interview with Kenneth E. Grant, pp. 19–22

role of conservation districts in land use planning. Gordon K. Zimmerman, p. 227

Rothwell, Dan, mountain ranch (Mo.), p. 150

Rowan, Charles L.: *It's not nice to fool with Mother Nature*, pp. 195–197

Runkel, Sylvan T.: *Paradise Valley, a land for people*. With Lynn A. Betts, pp. 36–37

Runoff goes underground. Morris S. Gillespie, pp. 46–47

rural Vermont town plans for its future. Barry Stryker and William T. Steele, pp. 200–201

SAND DUNE(S)—

‘Emerald Sea’ (Md., N.J.), p. 77

islands saved by Girl and Boy Scouts (Wash.), p. 129

landfill area for wildlife (Maine), p. 171

SANITARY LANDFILL(S)—

for garbage disposal (La.), p. 130

for Kemmerer (Wyo.), p. 133

from gravel pits (Nebr.), p. 40

Sauerwein, W. J.: *Horses win, tractors lose*. With J. T. Beene, pp. 252–253

Schmelzer, Gene, recreation (Iowa), p. 36

Schwieh, Jerry D.—

Bringing back prosperity, pp. 246–247

The (30-acre) plot against pollution, p. 203

Scout(s)—

Boy and Girl, Thompson Creek watershed dams, camping (N.Y.), p. 60

search goes on. Kenneth E. Grant, p. 88

SEDIMENT—

and erosion control conferences and institutes, p. 116

collecting ponds in a strip-mined area (W. Va.), p. 126

control legislation, p. 207

costly water pollutant, pp. 214–215

in the Sevier River Basin (Utah), p. 72

major pollutant, p. 115

problems solved by tile intake terraces (Iowa), p. 105

reduced by channelization (N.C.), p. 24

storm-water management (Md.), pp. 123–125

to be reduced by plantings, Lake Tahoe (Nev.), p. 75

Sedimentation, Lake Tahoe basin (Nev.-Calif.), p. 229

Senegal, soil and water program, pp. 6, 14

Shoreline regulations, Lake Tahoe (Nev.-Calif.), p. 229

Silt removal from land and streams, Hurricane Camille (Va.), p. 10

Simons, W. B., provides recreation benefits for employees and townspeople (Ala.), p. 240

Small Business Administration, loans for Lehman Hot Springs (Oreg.), p. 152

Small game, big gain. Nat White, pp. 174–175

Smith, Donald C.: *Chemical tolerant switchgrass to help control water pollution*, p. 78

Smith, Gordon S.: *Kentucky city generates prosperity with water*, pp. 25–27

So you want to live in the country. William R. Hauck, pp. 156–157

SOIL(S)—

data by computer, p. 140

Horizon Hills, Council Bluffs (Iowa), p. 105

information for Lake Tahoe (Nev.-Calif.), p. 228

information helps canning plant to control its pollution problem by dike diversion system (Ill.), p. 203

loss limit regulations (Iowa), p. 190

loss limits (Iowa), p. 207

map compilation and Advanced Mapping System, p. 93

map for Birmingham suburb (Ala.), p. 98

maps of Nevada land, pp. 100–103

maps used in highway construction plantings (Nev.), p. 74

sugar clay damages house (Calif.), p. 106

survey information faster, p. 91

SOIL CONSERVATION DISTRICT(S)—

builder's code (Nebr.), p. 217

environmental principles and land use planning, p. 227

helps to control pollutants, pp. 120–122

involved in erosion and sedimentation control, p. 115

Macon County (Tenn.) Soil Conservation District selects first junior board of supervisors, p. 271

progress, fiscal 1972, p. 141

sediment control institutes and laws, pp. 116–119

statistics, p. 212

Soil Conservation Service—

assistance in Algeria, Brazil, Ecuador, India, Nigeria, Pakistan, Senegal, Thailand, Turkey, Vietnam, Zambia, pp. 3–6, 14–15

assistance to local governments and agencies, fiscal 1972, p. 141

assistance with farm conservation plan started a vacation farm (W. Va.), pp. 244–245

assists farmers, ranchers, and other landowners to improve land for wildlife, p. 191

conducts flood insurance studies for HUD. Romeo A. Rivera, pp. 50–51

cooperates in beef cow-calf project (Mich.), p. 56

cooperation with foreign countries, p. 16

designs wild rice paddies (Minn.), p. 188

established, p. 212

framework plan (recreation), p. 238

gives technical assistance in planning land use and conservation treatment for recreation developments, pp. 268–270, 276

ground water-channel improvement study (N.C.), p. 59

helped establish or expand recreation developments, pp. 235, 238

plant materials centers, p. 88

provided soil information, suggested pond sites and wildlife habitat development for nature center (Mich.), pp. 250–251

provides planning and technical assistance in development of private recreation enterprises (Ill.), pp. 246–247

provides technical assistance to Great Plains for land development for recreation; technical and financial help to sponsors of small watersheds and for development of public water-related recreation facilities, p. 260

soil surveys, p. 91

technical assistance in development of recreation development for industry (Ala.), pp. 240–241

technical assistance provided in land development, pp. 237–238

technical assistance and onsite recommendations to landowners in wildlife management areas (Colo.), pp. 248–249

SOIL SURVEY(S)—

a base for building codes. W. Barry Baker, pp. 264–265

Birmingham area as a new town (Ala.), p. 98

- Cromline Creek watershed (N.Y.), p. 147
 Greenbrier County, publicity (W. Va.), p. 94
 information faster, p. 91
 manuscripts recorded on computers (Tex.), p. 92
 paid for by Cumberland, Hoke, and Mecklenburg Counties (N.C.), p. 108
 paid for by Westchester County (N.Y.), p. 107
 progress, fiscal 1972, p. 140
 reconnaissance, needed for most of Nevada's land and for urban expansion, p. 102
 Report for Cabell County (W. Va.), p. 195
 SCS comprehensive soil maps helped in establishing building codes (Ohio), pp. 264-265
 Springfield, DeRidder, New Orleans, Shreveport, Farmersville, town for good land use planning, pp. 230, 223
 used to carry out land use plans (Nev.), p. 272
- SOUTH AMERICA, soil and water conservation projects, p. 3
- SOUTH CAROLINA—
 educational meetings on sediment control and on sediment control law, p. 116
"Special Genius"—SCS multimedia show, pp. 274-275
 Speich, Robert A.: *Living high in Appalachia*. With John P. Carr, pp. 96-97
 Sport Fisheries and Wildlife, buffalo, elk, and longhorn, Fort Niobrara (Nebr.), p. 164
 Stamm, Carl R.: *Nature on exhibit*, pp. 250-251
 Statistical Reporting Service, figures for new orchardgrass (Wash.), p. 67
 Steele, William T.: *A rural Vermont town plans for its future*. With Barry Stryker, pp. 200-201
Storm water, hold it! Vincent J. Price, pp. 123-125
- STREAM(S)—
 channel improvement, p. 19
 channelization improvement (N.C.), p. 23
 restoration, Hurricane Camille (Va.), p. 10
 restoration, Hurricane Camille (W. Va.), p. 11
- STRIP MINE(S)—
 damage, p. 214
 sediment-collecting ponds (W. Va.), p. 126
- STRIP MINING—
front: achievement in the trenches. James Thorn, pp. 126-127
 reclamation, Dave Johnston and Jim Bridger Plants, costs (Wyo.), p. 198
 Stryker, Barry: *A rural Vermont town plans for its future*. With William T. Steele, pp. 200-201
Sugar water. Gene Warren, pp. 34-35
- SURFACE-MINED—
 land reclamation, p. 199
 land reclaimed by 'Arnot' bristly locust and 'Cardinal' autumn-olive (Md., N.Y.), pp. 69-70
 Surface mine(s), sediment-collecting ponds (W. Va.), p. 126
- Taggart, John S.: *A dam in time saves and saves and saves*, p. 33
Tahoe: planning for a special area, pp. 228-229
- TENNESSEE—
 Thompson Creek watershed, dams for wildlife, recreation, p. 60
- TERRACE(S)—
 diversion protects barns (Iowa), p. 36
in town. Cal Cox, p. 105
 parallel with underground water system (Ala.), p. 46
 tile intake, Horizon Hills, Council Bluffs (Iowa), p. 105
- TEXAS—
 forb plants being developed by Knox City Plant Materials Center, p. 71
 Knox City Plant Materials Center, grass seed stripper for fluffy seed, p. 80
 Selection 75 kleingrass by Knox City Plant Materials Center, p. 68
 South Regional Technical Service Center soil survey manuscript on computers, p. 92
- THAILAND, soil and water program, progress, p. 14
They touch the environment. Henry J. Ritzer, pp. 52-54
They're young, concerned, and active. Roy Palk, p. 271
(30-acre) plot against pollution. Jerry D. Schwien, p. 203
This industry is rated "X"—for "excellent". Morris S. Gillespie, pp. 239-241
This land is not for wasting. Bert J. Jahn, pp. 266-267
 Thompson, Carl V., Jr.: *Recreation supermarket for big city appetites*. With Jimmy Mangum, pp. 192-193
 Thompson, Richard L.: *Help yourself*, p. 133
 Thorn, James: *On the strip mining front: achievement in the trenches*, pp. 126-127
- TILLAGE—
 minimum (Ill.), p. 43
 minimum, no-till, p. 213
- Titchner, John C.: *Olympic-size pond*, pp. 59-60
- Town planning, West Fairlee, resource planning for future (Vt.), p. 200
- Trails for the blind and others (Mass.), p. 54
Treat your waste right. Gene Warren, pp. 130-132
- TREE(S)—
 and grasses for sand dune islands (Wash.), p. 129
 and shrubs in packet for reforestation, wildlife, and beautification (Ohio), p. 55
 'Emerald Sea' for sand dunes (Md., N.J.), p. 77
 management program (Wash.), p. 202
 on cleared acres, Mill Creek watershed (Ga.), p. 232
 timber and black walnut and other vegetation for wildlife (Ky.), p. 108
- Trew, Pat, steak (Va.), p. 194
- Tri-County High Plains Wildlife Management Area, open-hunting territory (Colo.), pp. 248-249
- Tully, Robert: *Hunting Allowed!* With Eldie Mustard, pp. 248-249
- TUNISIA—
 soil and water program, progress, p. 14
 watershed project to prevent flood ravages, p. 16
- TURKEY—
 Buyuk Menderes, from cotton to wheat by land leveling and siphon irrigation, p. 12
 soil and water program, progress, pp. 14-15
- Uhlig, Hans G.: *Review of Wilderness Canoeing*, p. 87
 Unger, David G.: *A new look at sediment control*, pp. 116-119
- U.S. Army Corps of Engineers—
 19,000-acre lake revitalizes area (Ill.), p. 246
Upstream dams reduce flood damage, p. 275
- URBANIZATION—
 Birmingham area (Ala.), p. 98
 Cromline Creek watershed, p. 147
 expansion (Nev.), pp. 100-103
 Fairfax County, Jean Packard interview (Va.), p. 218
 North Country, Piermond, land use ordinances (N.H.), p. 156
 soil and water resource planning, pp. 213-214
 West Fairlee town plans for future (Vt.), p. 200
 resorts use grass for ski slope conservation, p. 155
 Sevier River Basin, replacing sagebrush and juniper with grasses and forbs, p. 72
- Vasey, B. J.: *Reconnaissance soil surveys aid in planning in*

- Nevada. With F. F. Peterson and E. A. Naphan, pp. 100–103
- VERMONT, Orange County Natural Resource Team plans for West Fairlee, p. 200
- VIETNAM, soil and water program, progress, p. 15
- VIRGINIA—
- Buena Vista, converting old farm into Glen Maury Park, p. 104
- cattle farmers could use rural vacationing properties for year-round beef pasture, p. 194
- Dismal Swamp Canal channelization, p. 23
- Fairfax County, interview with Jean Packard on environment, p. 218
- Hurricane Agnes, dams held back water, p. 141
- Hurricane Camille, Amherst and Nelson Counties, stream channel and land restoration, p. 10
- Reston, good land use planning, p. 226
- sediment control law, p. 118
- Wagner, Robert E.: *Recreation: a new industry for the Great Plains?* With Richard L. Bury and Billy H. Hardman, pp. 259–261
- Warren, Gene—
- From the ground up*, pp. 230, 223
- Sugar water*, pp. 34–35
- Treat your waste right*, pp. 130–132
- WASHINGTON—
- Columbia Basin, Potholes Reservoir, sand dune islands saved by Boy and Girl Scouts, p. 129
- Douglas County, sage grouse watering pits, sagebrush, p. 169
- 'Latar' orchardgrass. Cover photograph, p. 66
- 'Latar' orchardgrass by Pullman Plant Materials Center, p. 67
- tree-management program, campground for added income, p. 202
- WASHINGTON, D.C., National Conference on Sediment Control, p. 116
- WASTE(S)—
- animal wastes as pollutants, p. 121
- sewage lagoon (La.), p. 130
- solid and animal, p. 214
- WATER—
- Bluestone State Park, Jumping Branch, Nimitz, Mountain-Dominion RC&D Project, municipal water system (W. Va.), p. 97
- canning company, sprinkler system returns all water to plot of ground (Ill.), p. 203
- channelization, streams, p. 19
- Elizabethtown expansion (Ky.), p. 26
- resource development, Cromline Creek watershed (N.Y.), p. 148
- storm-water management; roof-top and parking lot storage; underground storage, ponds (Md.), p. 124
- 365 days a year*. Jay M. Hall and Brent Conlin, p. 199
- Timber Creek watershed, Winfield floodwater reservoir (Kans.), p. 58
- to have and to hold*. S. H. Keller, p. 58
- wild rice paddies temporary water reservoirs (Minn.), p. 189
- WATERSHED(S)—
- channelization, an interview, p. 19
- guidelines for Cromline Creek, flooding, pollution, recreation, p. 147
- Gum Neck, Pollock Swamp, channelization, floods (N.C.), p. 24
- land use planning (Va., Ga., Pa.), pp. 231–232
- Lower Bayou Teche, marsh protection, sugarcane water, floods (La.), p. 34
- Marsh Creek, Wellsboro, flood prevention and recreation (Pa.), p. 231
- Mill Creek, improved water and fire control and water for Pembroke (Ga.), p. 232
- Montpelier Creek, dam, irrigation (Idaho), p. 33
- Mountain Run, Culpepper, flood prevention and municipal and industrial water (Va.), p. 231
- pilot in Oued Marguellil (Tunisia), p. 14
- progress, fiscal 1972, pp. 141–142
- recreational watershed projects, p. 238
- Rocky Comfort Creek, Warrenton, water for sewage oxidation ponds (Ga.), p. 231
- Spring Creek, stream channel and land restoration, Hurricane Camille (W. Va.), p. 7
- Swift Creek, Creeping Swamp, study of effect of channel improvement on ground water (N.C.), p. 59
- Timber Creek, Winfield, floodwater storage reservoirs and city water and recreation (Kans.), p. 58
- Upper Rock Creek (Md.), Mauch Chunk, Marsh Creek (Pa.), Nanticoke, Ishua, Deer, Conewango Creek (N.Y.), Choptank River (Del.), Pohick Creek, Roanoke Creek, Mountain River (Va.), dams hurricane, pp. 28–32
- Valley Creek, Elizabethtown, recreation, less floods more water (Ky.), p. 25
- We care about birds*. David N. Allan and Patrick W. Grace, pp. 171–173
- Weatherly, Katie, (N.C.), p. 24
- Weggel, Vee E., *Review of Landscaping for Birds*, p. 255
- Welcome, ducks!* Rose C. Fleming, p. 178
- WEST VIRGINIA—
- Cabell County Soil Survey Report, p. 195
- Greenbrier County Soil Survey, p. 94
- Greenbrier County, stream channel and land restoration, Hurricane Camille, p. 11
- Jumping Branch, Nimitz, Bluestone State Park, Mountain-Dominion RC&D Project, flood prevention and municipal water supply, p. 97
- sediment-collecting ponds below strip mine, p. 126
- sediment institutes, p. 116
- Weston, James A.: *Cover for bare ski slopes*, pp. 154–155
- What is this American land that so many people are planning for?* pp. 220–221
- When Hurricane Agnes reigned—and rained*, pp. 28–32
- Wherever we can help*. Kenneth E. Grant, p. 16
- While the iron is hot*. Kenneth E. Grant, p. 91
- White, Dick, (W. Va.), p. 126
- White, Nat: *Small game, big gain*, pp. 174–175
- White, W. B., (N.C.), p. 24
- Whitt, Darnell M.: *Recreation—as big as all outdoors*, pp. 235–238
- Who stops where*, p. 202
- WILDLIFE—
- aided by farmers and ranchers, p. 184
- aided by farmers, ranchers, and other landowners, p. 191
- Big Lake Club of Tulsa, natural lake for wood ducks and waterfowl habitat (Okla.), p. 176
- channelization, streams, p. 19
- converted beaver ponds for ducks, flood control structure, nesting boxes (Miss.), p. 178
- Cromline Creek watershed (N.Y.), p. 148
- deer and antelope on reclaimed strip-mined land (Wyo.), p. 198
- deer increased because of Mill Creek watershed (Ga.), p. 232
- food stripe, access trails for observation, grasses, shrubs, and seedlings planted for food and cover (Mich.), pp. 250–251

- Fort Niobrara refuge for elk, buffalo, and longhorn (Nebr.), p. 163
- habitat on wild rice paddies (Minn.), p. 201
- Hackney Deer Restoration Project for deer and other wildlife (N.C.), p. 179
- improved by channelization (N.C.), p. 24
- on converted desert land, Randolph County (N.C.), p. 174
- progress, fiscal 1972, p. 141
- protected by watershed dams (N.Y.), p. 31
- rates the best we can give.* Kenneth E. Grant, p. 184
- reforestation and beautification packet program, tree and shrub seedling plants (Ohio), p. 55
- restored, Hurricane Camille (Va.), p. 10
- Ring-necked pheasant in Columbia Basin (Wash.), p. 266
- sage grouse watering pits (Wash.), p. 169
- terns and other wildlife on converted landfill (Maine), p. 171
- This land is not for wasting.* Bert J. Jahn, pp. 266-267
- Thompson Creek watershed dams (N.Y.), p. 60
- watering ponds on mountain ranch (Mo.), p. 150
- woodlands (Ky.), p. 108
- Wilker, Carl: *Bring back the grass*, pp. 72-73
- Wilson, Delbert and Del Ray, formerly desert area (N.C.), p. 174
- Wind erosion, Maine RC&D Project, landfill (Maine), p. 171
- Winners in Nevada—the motorists.* Norman R. Ritter, pp. 74-75
- WISCONSIN—
- Regional Planning Commission, p. 226
- sewage leakage on land causes children's illness, p. 224
- Wyalusing State Park, Girl's Conservation Camp, p. 48
- Wood ducks flock to flooded woods.* Gary Bullard, pp. 176-177
- WOODLAND(S)—
- hardwoods flooded and drained for ducks (Okla.), p. 176
- less is more.* Lewis H. Jump, p. 202
- WYOMING—
- Dave Johnston and Jim Bridger Plants, reclaiming strip-mining land, costs, p. 198
- West Wyoming RC&D Project, Kemmerer, sanitary landfill and cemetery improvement, p. 133
- YOUTH, first junior board of supervisors serve in Tennessee, p. 271

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SOIL conservation

August 1972, Vol. 38, No. 1

The Soil Conservation Service, for 10 years, has been sharing its knowledge of soil and water conservation with foreign countries, especially developing countries. In this issue of SOIL CONSERVATION, Joseph B. Rogers, assistant to the SCS Administrator for International Programs, summarizes this decade of international aid in conservation.

The article about the Turkish farmer breaking a 40-year cotton cycle reveals very well the results of SCS's work with other agencies of USDA, the State Department, and the governments of the participating countries. Co-author Fuchs writes from experience. He served in Turkey with an SCS/AID team a couple of years ago.

And after 2 years, Camille is still remembered. "Camille was no lady" is an account of the restoration work in Virginia and West Virginia.

- 3 A decade of international cooperation
by Joseph B. Rogers
- 7 Camille was no lady
Virginia—by Warren G. Friend
West Virginia—by Albert E. Beaty
- 12 Conservation breaks cotton cycle
by Atif Atilla and S. H. Fuchs
- 16 From the Administrator
Wherever we can help

COVER: Workers on a farm in India apply fertilizer on a field prior to planting. The farmowner is a co-operator in a regional pilot project sponsored by the U.S. Agency for International Development.

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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On February 7, 1962, D. A. Williams, Administrator of the Soil Conservation Service at that time, signed an agreement between the Soil Conservation Service and the Agency for International Development (AID) to help set up a soil and watershed management program in Tunisia. This marked the formal introduction of the Soil Conservation Service into the foreign assistance field.

Up to this point, SCS had never worked on a contract basis in a foreign country. Those SCS people who had been on foreign assignment had been temporarily transferred to the International Cooperation Administration or other foreign-assistance agencies.

In the 10 years since 1962, SCS has signed participating agency service agreements with the Agency for International Development for work in 12 countries in Africa, Asia, and South America. These agreements have all followed a similar pattern whereby the Service agrees to help with the planning and application of soil and water conservation practices and the training of personnel in developing countries.

This article is a summary of the work and accomplishments of SCS personnel in foreign countries during the past decade.

Algeria

In 1963, SCS began an AID program with the Government of Algeria. The aim was threefold: (1) Install soil and water conservation practices on eroding agricultural land, (2) provide employment to Algerians by utilizing hand labor, and (3) train Algerian technicians in the soil and water conservation methods used in the United States.

SCS provided teams—specialists in soils, engineering, and plant materials—for three field locations and a team leader located at Algiers.

A decade of international cooperation

by Joseph B. Rogers

Assistant to the Administrator
for International Programs, SCS
Washington, D.C.

Three plant materials nurseries were established under SCS guidance to provide tree planting stock and grass and legume seed for use in the project areas.

Hand labor was used to install such conservation practices as diversions, rock drops and check dams, spring developments, earth dams for water impoundment, terraces, tree planting, and strip-cropping.

Reports show that about 30 projects with 8,000 to 9,000 workers were in operation at one time.

AID assistance was discontinued in the fall of 1965, and SCS personnel returned to the United States or were assigned to other countries.

Brazil

Three SCS soil scientists worked in Brazil under an AID agreement from January 1965 to December 1968. Their objectives were:

(1) To determine the location

and extent of relatively unsettled areas that could provide economic opportunity for several million people from the northeast and other heavily populated areas.

(2) To help increase the size, scope, and effectiveness of the soils staff within the Ministry of Agriculture.

The following summary was made by the USDA Chief of Party for Brazil: "This has been a successful project . . . [it] is being left with a competent corps of professionals that can carry on and reach the objectives sought. Credit should go to all personnel involved and in particular to Loyd Garland, Francis Cleveland, and Dirk van der Voet of the Soil Conservation Service."

Ecuador

USDA signed an agreement with AID on March 16, 1966, to provide assistance to Ecuador. This agreement resulted from previous visits to Ecuador by a



number of USDA people. Gene Buie, director of the Soil Conservation Service's River Basins Division, went to Ecuador in January 1966 as a member of a USDA team reviewing the areas where our technical assistance was needed most.

The agreement provided for the services of 12 full-time specialists, including an SCS irrigation water management adviser and several short-term consultants in several fields.

Roy D. Thompson, state conservation engineer in New Mexico, was selected as the full-time water management adviser, and Laird Wolfe, assistant state conservationist in Nebraska, was selected for a special 3-month assignment.

Phil S. Eckert, chief of the USDA team in Ecuador, stated that Wolfe contributed greatly to the total program and represented the Soil Conservation Service with distinction.

Roy Thompson, who served

for 17 months as water use management adviser and for 7 months as acting leader of the USDA team, provided leadership for the following projects:

(1) Preparing a feasibility study for an irrigation project.

(2) Preparing specifications for and designing a potable water system for a village of more than 600 people and supervising its construction.

(3) Preparing engineering and irrigation criteria for a rice program.

(4) Adapting a technical publication on growing rice in the Philippines to Ecuadorean conditions.

(5) Preparing a water-use manual for Ecuadorean water-use engineers.

SCS's technical assistance program in Ecuador was terminated at the end of Thompson's tour.

India

In 1966, a team of four SCS people, including the Adminis-

trator of SCS, visited India to study special problems and technical needs in irrigated agriculture.

The following year an agreement was initiated with AID, and a team of experts in soil and water management was selected and sent to New Delhi. Their objective was to develop policies and programs for an integrated approach to a soil and water management program for India.

The team included specialists in irrigation and drainage, hydrology, sedimentation, soils, engineering, ground water, tubewells, economics, and resource inventory and evaluation. Each of these men worked with Indian counterparts in formulating policies, starting pilot projects, developing technical guides and handbooks, and organizing and promoting research.

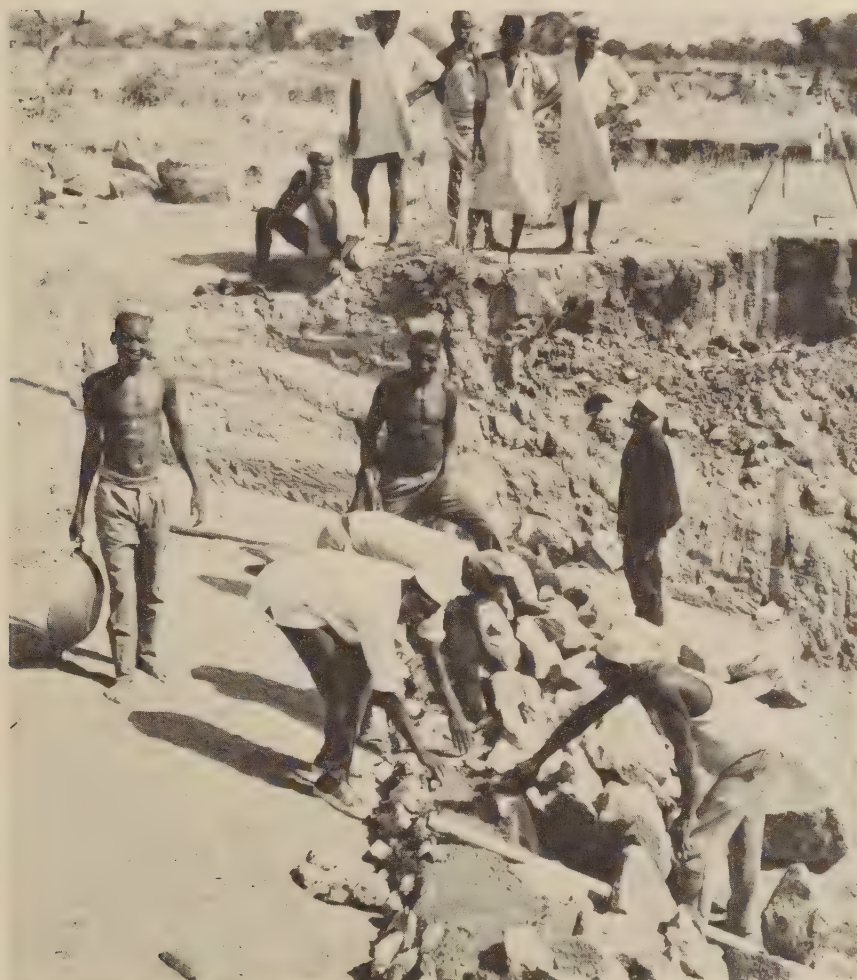
Three pilot projects were initiated in cooperation with Indian state governments. The Mysore State Project started in 1967 and



(Left) Algerian workers building a diversion ditch.

(Right) This Indian farmer presumably is ready to trade his old wooden plow for the new steel plow firmly held by Kenneth E. Grant, Administrator of SCS.

(Below) Nigerians constructing a drop-chute structure along a deep ravine. Diversions will direct water to the structure, which will prevent the water from dropping directly into the ravine.



became operational in 1968. The first of its kind in India, it included both irrigated and rainfed water management studies and demonstrations.

The second pilot project became operational in Punjab State early in 1969. About 6 months later the third project was started in Uttar Pradesh State.

SCS assigned four men to each project. They assisted the state governments in accomplishing the following objectives:

(1) Bring together the various disciplines needed to identify problems and needs relating to soil and water management and develop plans of action, technical guides for land treatment, and water and crop management programs to meet problems and needs.

(2) Develop and provide training for Indian professionals in agriculture work so they can give technical and other assistance to land users in planning and applying a soil and water management program.

(3) Test, evaluate, and dem-



Cleaning newly harvested rice in the Casamance Region, Senegal.

onstrate the management techniques that make the most efficient use of soil and water resources.

In 1970 and 1971, at the height of SCS operations in India, SCS had 20 men there; eight on the central project in New Delhi and four each in the three states.

Kenneth E. Grant, SCS Administrator, visited India in 1970 and again in 1972 to review the projects.

The Government of India has decided to phase out the pilot projects as the tours of duty of SCS personnel are completed. SCS work in India will come to an end in 1972.

Nicaragua

On June 26, 1964, USDA signed an agreement with AID to provide technical assistance to Nicaragua. In March 1965, Gerald Darby, an SCS agrono-

mist, joined the USDA team there. He was to help develop and carry forward a workable plan for improving forage crops, for feed conservation, and for soil and resource conservation in general.

Objectives of the work were to find high-producing, easily established grasses that were more palatable than local grasses; to find grasses that could do well on the poorly drained, heavy clay soil that covers extensive areas in Nicaragua; and to find perennial legumes that were compatible with the pasture grasses.

SCS also sent two engineers to Nicaragua on a short-term basis to help locate sites for livestock ponds and to review the potential for irrigation development.

Nigeria

In 1965, the Government of Nigeria developed a soil conservation project for the northern part of the country, where erosion is severe, and asked AID for

technical assistance. As a result, SCS sent a team of professional conservationists to Nigeria.

Two conservation engineers, a soil conservationist, and a soil scientist arrived in Nigeria during the summer of 1965 and began working with local technicians and land users. They helped identify and apply needed soil and water conservation practices, including masonry check dams, diversion ditches, terraces, and contour cultivation.

In 1969 a training center was established at Jos. The Nigerian Government assigned several of its best technicians to the center as instructors. At first they were assisted by the four SCS men still in Nigeria. Six-month courses in general soil and water conservation and in irrigation water management were initiated.

In 1971 it was decided that the SCS team could be phased out and that the local staff could carry on. The last SCS adviser left Nigeria in June 1972.

Senegal

After reviewing Senegal agriculture needs in 1966, USDA entered into an agreement with AID in January 1967 to provide technical assistance to Senegal.

During the first year, SCS provided the team leader and several short-term consultants in soils, agronomy, and engineering. A full-time engineer was sent in March 1968.

In March 1971, when SCS personnel completed their assignments in Senegal, the team leader reported that crop diversification and large increases in production of corn, millet, and peanuts had been achieved. Production had increased three or four times for all crops except millet.

The project also trained 10 to 20 agriculture students in field operations each year. In addition, many hundreds of farmers, government officials, research per-

Continued on p. 14

Camille was no lady

Postscript to a killer hurricane—

In Virginia

by Warren G. Friend
District conservationist, SCS
Lovington, Virginia

Hurricane Camille struck central Virginia on the night of August 19, 1969. The devastation was incredible. One hundred and fifty-three lives were lost. Damage to property was estimated at \$113 million.

The storm centered over Amherst and Nelson Counties, causing extensive landslides and flooding. As much as 31 inches of rain fell on this area in less than 6 hours.

Landslides began at the very crest of ridges. The moving mass of soil, boulders, and trees destroyed everything in its path. The debris and silt blocked valleys, filled streambeds, and covered fertile cropland.

The damage was particularly severe on small and intermediate streams. Water wandered aimlessly over the valley floor seeking channels, but the channels were already filled.

The task of cleaning and reshaping the land and opening stream channels was beyond the individual means of most of the landowners. Help was needed.

The Soil Conservation Service promptly requested emergency funds under Public Law 534, Section 216 of the Flood Control Act of 1950. A total of \$4,299,200 was made avail-

Continued on p. 10

In West Virginia

by Albert E. Beaty
District conservationist, SCS
Lewisburg, West Virginia

Hurricane Camille destroyed two West Virginia valleys in the summer of 1969. Today, the valley people say the federally financed recovery work, supervised by the Soil Conservation Service, has brought the land back to full productivity.

The killer hurricane, which traveled north from the Gulf Coast then east in a lethal sweep to the Atlantic Ocean, virtually annihilated streambeds and valley floors in western and eastern Greenbrier County, West Virginia. The county is the home of the world-famous Greenbrier Hotel.

Massive flash flooding occurred on August 19, 1969, at the little town of Anjean and along Spring Creek after extremely heavy rains. A second flash flood, 16 days later, roared through the Spring Creek watershed, near Renick. People in the area say that between 15 and 20 inches of rain fell during each of the 5-hour storms.

It took 15 months to clean up the mess.

The floods damaged houses, farm buildings, farmland, and stream channels. Several houses and buildings were torn from their foundations. Two women died. The rushing water also de-

Continued on p. 11

Virginia



1

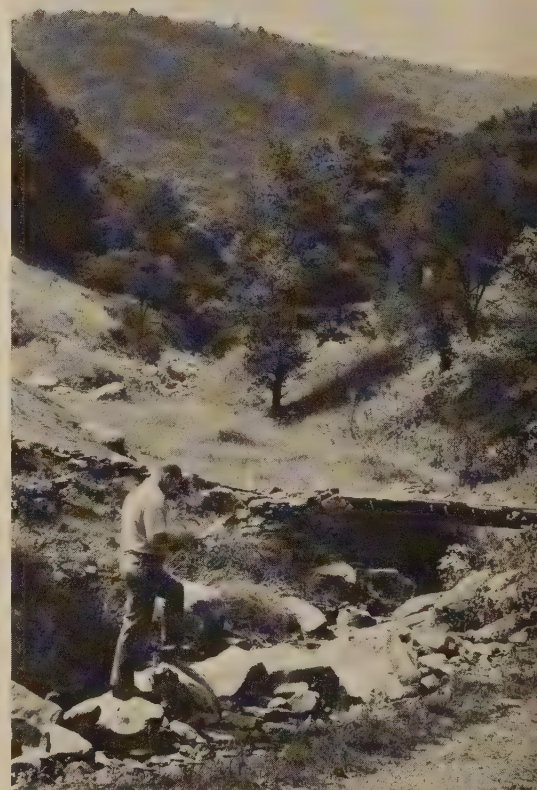


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West Virginia



3



4



1. Draglines were needed to remove silt and sand from many stream channels.
2. After Camille, Davis Creek in Nelson County was a challenge to men and equipment.
3. The massive rocks weren't there before Camille.
4. Two years later, again the rocks aren't there. But removing them wasn't easy.
5. Floodwaters didn't destroy the house but left the land littered and destroyed the natural stream channel at the bottom of the hill.
6. It took 2 years to clean up and revegetate.



5



6

Continued from p. 7

able for restoring about 600 miles of stream channel and for stabilizing about 4,000 acres of critical silt-producing land. More than \$3 million was spent in Amherst and Nelson Counties.

The work began in October and was carried out within the existing organizational framework of the Service.

The first step involved planning. The work had to be done quickly, but it had to be done right. Hydrologists and engineers helped determine size and cross section of channels. Agronomists helped prepare specifications for stabilizing streambanks and critical slide areas. Wildlife biologists helped with guidelines for restoring wildlife and fish habitat. Planners determined how and where to spread spoil and dispose of debris.

County governing bodies and the eight soil and water conservation districts in the damaged area volunteered to sponsor the restoration projects. They assigned priorities and got necessary work permits from landowners. Contracts were let, and a qualified inspector was assigned to each project.

The inspectors were the core of the operation. They contacted every landowner affected by the restoration work. They had to make countless on-the-spot decisions because conditions were so variable.

Stream channels were cleared of silt and debris. Woody material was piled for burning. Stones and boulders were buried, piled, or used to line the new channel. Existing vegeta-

tion was preserved where possible; bare areas were seeded. Attempts were made to deepen some places in the channel for fish.

One year later, 80 streams—550 miles of stream channel—had been restored. The work had involved nearly 3,500 landowners, 12 counties, eight soil and water conservation districts, and 10 SCS work units. At the peak of the operation, about 80 professional people and more than 150 pieces of heavy equipment were on the job.

Two seed mixtures were used in revegetating nearly 4,000 acres of denuded land, channel banks, and other critical areas. These mixtures included annuals and perennials; sericea lespedeza was the base for both. The seed was blended in bulk with a high analysis 30-15-5 fertilizer at the rate of 68 pounds of seed to 400 pounds of fertilizer. This rate of 468 pounds per acre was used in all types of seeding.

Urgency and uniqueness of an area determined the seeding method. In an accessible area, a farm tractor with a whirlwind seeder was used, followed by a chain harrow to cover the seed. About 1,000 acres of slides, critical areas, and less accessible streambanks were seeded by helicopter. Hand seeders were used in some areas. Channel banks were seeded immediately after construction.

The method of seeding varied, but all seedings were successful. Excellent stands of sericea will furnish long-lasting cover with a minimum of maintenance and will provide food for wildlife.

Help came from other agencies. The Agricultural Stabilization and Conservation Service provided nearly \$2.5 million for 80 percent cost-sharing on emergency practices. Of the 4,577 requests for assistance received by ASCS in Virginia, 1,690 amounting to about \$1.2 million came from Nelson County.

The Office of Emergency Preparedness made about \$400,000 available for removing debris from privately owned land.

It has been 2 years since Camille struck. Scars remain on the landscape and in the hearts of people. But all is returning to normal. Land thought beyond reclaiming is producing again. Streams are winding their orderly way to the sea, and the people are beginning to smile again.

Recovery has been as incredible as Camille. ♦

Some scars and debris will remain for a long time.



The September issue of SOIL CONSERVATION will have a report on Hurricane Agnes.

Continued from p. 7

stroyed crops and drowned livestock.

Roads were washed out and at least a dozen bridges were destroyed. Mountainsides in timber and grass slid into the valley. Fences, which at first acted as nets, finally gave way before onrushing torrents of water and mud. Mobile houses, cars, and farm equipment were swept downstream. Damage from the two storms was estimated at a quarter of a million dollars.

The county was declared a disaster area by Governor Arch Moore of West Virginia and President Nixon.

The Secretary of Agriculture made the county eligible for funds under the Emergency Conservation Program.

The Soil Conservation Service was assigned the responsibility of technical supervision of the restoration work, and the Agricultural Stabilization and Conservation Service administered the funds.

On October 29, 1969, after claims had been processed, SCS began planning for the removal of debris from fields and streams.

The West Virginia Department of Natural Resources helped SCS develop plans for the stream improvement work.

There was a tremendous job to do. A sizable area of rich bottom land along Spring Creek was covered with rock, silt, and sand swept down by the flooding. In places, the litter was 10 feet deep.

The debris had to be removed to protect valuable farmland from future floods, prevent damage to streambanks, and restore fish habitat.

The stream channel also had to be cleared of fallen trees, logs, rocks, sand, silt, and other debris that retarded or diverted the streamflow.

In places, the original channel was completely filled with rock and silt. Restoration work crews piled and burned logs and lumber. Where the channel was reshaped, the banks were seeded to a hardy grass.

Many farmers had neither the time nor the equipment to remove the debris from their farms, so they had to contract out the work. The Greenbrier Valley Soil Conservation District hired a crew and a bulldozer. The crew worked from March to December 1970 removing debris.

The average cost per cleanup job was \$890. But opening the stream, reclaiming pastureland, and seeding all disturbed areas on one farm alone cost \$8,913.

George McGuire of Renick, one of the farmers who hired the conservation district



Greenbrier County residents say the bridge is "better now than before the floods."

crew to clear his fields and stream, said, "The district crew did an excellent job in removing debris."

SCS supervised debris removal on 120 farms.

Federal funds for the cleanup work came from the Department of Agriculture (80 percent) and the Office of Emergency Preparedness (20 percent). They totaled \$106,739.

Bill Lewis, commissioner of the Greenbrier County Court, commented about the assistance given to the county: "If the various government agencies had not worked with the local people in reclaiming their land, the people would have suffered immensely after every heavy rain. The emergency restoration work by the Soil Conservation Service and the Agricultural Stabilization and Conservation Service has made the Spring Creek watershed productive again." ♦

Conservation breaks cotton cycle



For years cotton has been the hallmark of agriculture in the lower Buyuk Menderes river basin in western Turkey. Many of the laboriously irrigated fields have been in cotton for as long as anyone can remember. According to farmer Halil Sen, "When asked why they plant cotton on a specific field, it is common for farmers to say, 'Because this is a cottonfield.'"

It was the same on Sen's farm; for 40 years his fields had been kept in cotton.

Halil Sen's farm is 8 miles from the Roman ruins of Ephesus. Sen and his three sons irrigated their fields by small basins which were constructed with hand shovels—an irrigation method used by the Romans on the same fields 2,000 years ago.

Sen's small basins required constant attention; extensive building up of borders and many changes of water were necessary. Three men were kept busy controlling the water.

Customarily, Sen and his sons would start irrigating on July 15. They were able to complete only two irrigations by the first of September—provided the pump didn't break down and the tractor could be spared to run the pump for that prolonged period.

It used to take three men working frantically to irrigate this field. Now one man can do it leisurely, because of furrow irrigation.

In 2 weeks, less than two-thirds of the field would be irrigated, and the crop in the part of the field that had been irrigated first would begin to show signs of moisture deficiency. With the available water and the basin irrigation method, at least one-third of the field was continually dry, and part of the crop always "burned up."

Sen averaged a bale of cotton per acre!

In December 1967, Turkey's General Directorate of Farm, Irrigation, and Soil Conservation (Topraksu) began an onfarm water-development program to help farmers in the Buyuk Menderes basin. Topraksu technicians work with farmers, helping them plan, apply, and maintain needed conservation practices. Bench leveling for irrigation water management and crop rotation are two important practices in the program.

Sen's conservation farming plan included land leveling, furrow irrigation of row crops, return of crop residues to the soil, and use of green manure crops and other fertilizers.

Sen and his sons began implementing their plan in April 1969 by leveling a 16-acre field. They wanted to plant the field to grain sorghum, which had shown excellent results the previous year in nearby demonstration projects, but the high-yielding variety of sorghum seed was not available, so the Sens planted cotton.

After leveling the field and planting cotton, the Sens used a locally manufactured sweep to prepare irrigation furrows. Borders were spaced 15 rows (35 feet) apart to insure irrigation with ease.

Topraksu technicians used an auger to determine when to irrigate and estimated the amount of water needed to raise moisture in the root zone to field capacity. They made ring infiltration studies on the soils to calculate how

long the water would have to be on the land to get the desired amount of moisture into the soil.

Two sizes of locally manufactured siphon tubes are used in each row to advance the water down the row. It takes about 30 minutes for the water to advance three-fourths the length of the 800-foot rows. When the water reaches that point, the larger tubes are removed, leaving the smaller ones to complete the irrigation. The water runs in each row for about 2½ hours.

Farmers in the area watching furrow irrigation on the Sen farm found it hard to believe that water could run 800 feet in rows with nothing more than siphon tubes and furrows to control it. The Sens had leveled their field well.

When the Sens began their first irrigation, three men as in the past were on the field. They soon realized, however, that one man could set and change the siphon tubes and still have free time.

Halil Sen and his sons are jubilant over the reduction of their workload and pumping time. They can now easily irrigate their field three or even four times before the first of September. Soil moisture is sufficient to prevent crop burnup.

The Sens also have been able to open up more land for other purposes. "There were parts of the field that we couldn't irrigate before," Halil Sen pointed out, "and there was a large low area in the middle of the field where water stood for long periods every winter during the rainy season. Growing wheat was out of the question because much of

by Atif Atilla

Agronomist,
General Directorate of Farm, Irrigation,
and Soil Conservation
Turkey

and S. H. Fuchs

Conservation agronomist, SCS
Upper Darby, Pennsylvania

it would drown in the standing water. Land leveling has brought us a uniform stand of both crops, cotton and wheat, and we can use all of the field."

Because of plant disease problems, low yields, and unattractive prices, many farmers in the Buyuk Menderes region have been looking for crops other than cotton. Demonstration projects in the area have shown excellent results with sorghum, corn, and wheat. Some varieties of potatoes and tomatoes and citrus and other fruits have done well on many of the soils.

Sen's crop rotation program called for planting Mexican wheat after cotton, then a U.S. variety of grain sorghum in June, followed by vetch as a winter cover and green manure crop. After Sen's cotton harvest—a one-third increase in yield despite heavy infestation by wilt—the cotton stalks were plowed under and Mexican wheat was planted in mid-December, breaking a 40-year continuous cycle of cotton.

Farmers throughout the lower Buyuk Menderes river basin are requesting technical assistance from Topraksu, which is a counterpart of the Soil Conservation Service in the United States. Their enthusiasm has proved the success of Topraksu's onfarm water-development projects. ♦

	Approximate man-days required to irrigate 16-acre field			Tractor-days required for pumping water to irrigate		
	Once	Twice	Three times	Once	Twice	Three times
Before leveling, using basin system	60-75	120-150	Too late in season	20-25	40-50	Too late in season
After leveling, using furrow system	5	10	15	5	10	15



Charles A. Borden, SCS soil scientist, on special duty in Thailand, gives onsite assistance on farm planning.

A decade of international cooperation

Continued from p. 6
sonnel, Peace Corps volunteers, and agricultural inspectors have benefited from observing project operations.

Although USDA has phased out its part of the project, well-trained Senegalese are carrying on and expanding the techniques developed.

Thailand

Since 1966, SCS has cooperated with AID in providing technical assistance on soil and water conservation projects to Thailand.

A five-man team worked with the Thailand Department of Land Development until 1970 when the original agreement with AID was phased out. Since then SCS has provided an irrigation specialist to assist with drainage and irrigation problems.

From 1966 to 1970, SCS helped Thai conservationists in giving technical advice on soil and water conservation to about 87,000 Thais. Direct assistance was given to 28,000 farmers, and conservation measures were

started on about 110,000 rai of land (one rai equals 0.395 acre).

Soil survey, soil classification, and land capability work was conducted on an estimated 105 million rai. A soil interpretations handbook was prepared and issued along with soil suitability charts and other reports.

Local technicians were trained to use soil survey information for conservation planning and to help farmers apply soil and water conservation practices on their land.

SCS technical assistance in Thailand is continuing on a limited basis.

Tunisia

SCS work in foreign countries began in 1962 with the assignment of one man, John "Blackjack" Johnson, to help the Government of Tunisia. He was to plan a pilot watershed program in an area known as the Oued Marguellil, which comprises about 100,000 hectares.

A program was planned to follow SCS techniques for water-

shed planning prior to the actual installation of land treatment and structural measures.

From the beginning, the shortage of trained Tunisian manpower was a major limiting factor. Training in Tunisia and in the United States became one of the most important SCS contributions.

From March 1962 to June 1971, SCS provided soil scientists, agronomists, range conservationists, and engineers to the Tunisian Government. The one-man staff grew to 10 during the high point of operations in the latter part of the 1960's.

SCS helped complete soil surveys, prepare plans for sub-watersheds, design and install structures, and plan range practices—always using and training Tunisian personnel when available. SCS also helped to start a plant materials center for the production of seed supplies of local grasses and legumes for range seeding and for erosion control.

More and more Tunisian technicians completed their training and were assigned to the project. By the end of 1970 the Tunisian staff was in a position to take over all functions of the soil and water conservation program. The Oued Marguellil AID project was phased out in June 1971.

SCS still has an irrigation engineer and a range conservationist in Tunisia working on improving livestock production.

Turkey

Turkey's "soil conservation service," called Topraksu, was originally set up and established with help from SCS employees who transferred to the predecessor AID agencies and worked in Turkey. As a result Topraksu is organized and functions pretty

much as does our own SCS.

In the 1950's and 1960's several hundred Turkish employees of Topraksu were trained in the United States under AID scholarships. And many SCS specialists went to Turkey under AID auspices to assist the young Topraksu with organizational and technical problems.

A formal agreement with AID was signed in 1967 for assistance to Topraksu. Later that year a team leader, an agronomist, and an irrigation engineer began 2-year assignments in Turkey.

In 1968, a three-man team—agronomist, irrigation engineer, and drainage engineer—went to Turkey on a short-term basis to help develop technical guidelines and standards.

Direct technical assistance was discontinued in 1970, but SCS continues to have close ties with Topraksu and is proud to have been a part of the development of a fine sister organization. Most of the Topraksu senior staff, including the present Administrator, Nechat Erkenci, have received training and experience in the United States and are continuing to broaden the scope and effectiveness of soil and water conservation programs in Turkey.

Vietnam

In 1967 and 1968, SCS cooperated in a USDA agreement for providing technical assistance to upgrade Vietnamese agriculture. SCS concentrated on irrigation and rural engineering aspects of the work. The objectives were to:

- (1) Assist with planning, design, and construction of water control projects.
- (2) Assist in developing Vietnamese competence in water utilization and land preparation for water control.
- (3) Promote mechanization of agriculture, including adaptation and demonstration of simple agri-



The Tunisian technician on the left is showing a laborer how to set siphon tubes for furrow irrigation at a seed-producing center.

cultural equipment and water-lifting devices.

(4) Promote and assist with the formation of water user associations.

(5) Assist in developing in-service training programs.

SCS provided seven men at the peak of its participation—a team leader (an irrigation engineer), a soil scientist, and five irrigation specialists.

At the end of 1968, AID decided to continue the work with direct-hire employees.

William S. Gaud, Administrator for AID, in presenting that agency's Meritorious Honor Award to the Office of Domestic Production, USAID/Vietnam, cited the SCS team for its contribution.

Zambia

In May 1968, USDA signed an agreement with AID to provide qualified operational manpower to assist with Zambia's orderly economic development.

SCS assigned a soil scientist to Zambia in September 1968 to help carry out soil survey work

and furnish soil interpretations, to correlate the soils of Zambia into defined series, to train a Zambian staff in soil survey and interpretation work, to assist in selecting suitable areas for concentrated agricultural development, and to assist in selecting representative sites for research work.

During the 2 years of SCS assistance in Zambia, soil surveys were prepared in advance of planning on most development projects.

Short-term consultants

From 1962 to 1972 SCS sent 119 technical people to 33 countries on a short-term basis to give advice and recommendations. Kenneth E. Grant, SCS Administrator, made two trips to Pakistan to consult with government officials. Approximately 7,220 man-days of assistance have been provided.

The effect of this assistance on soil and water conservation programs around the world is difficult to ascertain, but it must be considerable if judged by present progress in this field as compared with that of 10 years ago.

Training in the United States

Throughout the past decade SCS has cooperated with many agencies and international organizations that have participant training programs. Under such programs students, technical people, and administrators come to this country to study techniques and procedures that can be adapted and used in their own countries. SCS has emphasized practical field training for these people.

During this period, 4,111 participants, sponsored mainly by AID, from 98 countries have spent 49,986 man-days with SCS. As a result, SCS is known around the world for its work in all aspects of soil and water conservation. ♦



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From the Administrator:

Wherever we can help

The United States has many different natural resource problems and different ways to solve them. Consider the variety to be found on a worldwide basis!

And yet, as we have found in America, there are similarities. Areas with comparable climate may benefit from similar types of technical conservation practices. Communities with comparable government may be able to use similar organizational or legal tools.

The ability to suggest alternatives for a workable practice or a workable program—and to innovate as the occasion demands—has been a trademark of the SCS conservationist. More than a hundred of our employees have traveled overseas for anywhere from a few weeks to 2 years or more to aid other nations in meeting conservation challenges.

A watershed project in Tunisia to prevent flood ravages . . . soil surveys in Brazil to find suitable areas for new homes and farms for millions of people . . . irrigation in India to help double food production . . . and several more.

The test of ability and innovation has been strong—for the SCS conservationist and for the people of another land with whom he works for a time. Both have passed the test. Foreign governments have spoken highly of our employees and their work overseas. SCS people have taught well and their counterparts have learned well—so well that SCS has been able to phase out its direct assistance in several countries.

In the process, the SCS people have learned as well. They return home better able to do their job or to take on broader responsibilities.

In addition to those SCS people who have given their talents overseas, hundreds more have helped foreign visitors. Thousands of

officials and technicians from other countries have studied in the United States at universities and have spent time in practical field training with SCS conservationists. The challenge of teaching and learning has been the same, with much the same result.

The need is great for expertise in natural resource management throughout the world. As Secretary Butz said recently, "All people everywhere have good reason to be concerned with the question of potential food resources versus an expanding world population . . . We must duplicate in the coming generation—in a mere 28 years—the productive capacity that man has achieved since the dawn of history!"

The world is interested in a quality environment as well as in food. A recent United Nations environmental conference voted to set up a strong U.N. environmental agency with a broad mandate.

Protecting resources as they are being used is the experience of the Soil Conservation Service. We are glad to share that experience with other nations when called upon to help them gear up to meet their own goals.

Kenneth E. Grant

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U. S. Department of Agriculture/Soil Conservation Service

September 1972

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Hurricane Agnes late in June engendered the worst floods the East Coast has seen in this century. The storm was not avoidable; its disastrous consequences, for the most part, were.

When headlines about flood damage and lives lost became less frequent, attention turned to those areas that suffered little from Agnes, though right in her way. Most of these were areas protected by watershed project measures, including dams and channel work. SCS Administrator Kenneth Grant, in this issue of SOIL CONSERVATION, discusses "channelization" with Hubert Kelley. And James Canterbury, in his article, tells us that farmers in eastern North Carolina approve wholeheartedly of channel work. The featured article on Agnes pinpoints the areas where SCS-assisted projects helped in preventing floods, property damage, and probably loss of life. Other articles point to the "extra" benefits that watershed projects can bring.

COVER: Lake Thunderhead, 3 miles from Unionville, Missouri, provides many scenic areas for camping.

- 19 The role of channels in total water management
An interview with Kenneth E. Grant
- 23 Channelization—the farmer's friend
by James H. Canterbury
- 25 Kentucky city generates prosperity with water
by Gordon S. Smith
- 28 When Hurricane Agnes reigned—and rained
- 33 A dam in time saves and saves and saves
by John S. Taggart
- 34 Sugar water
by Gene Warren
- 36 Paradise Valley, a land for people
by Sylvan T. Runkel and Lynn A. Betts
- 38 Review
- 39 Meetings
- 40 Recon

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EARL L. BUTZ, Secretary of Agriculture
KENNETH E. GRANT, Administrator, Soil Conservation Service
PHILLIP A. CHAVEZ, Editor
GEORGIE A. KELLER, Production Editor

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the role of channels in total water management

An interview with Kenneth E. Grant,
Administrator, Soil Conservation Service

The Soil Conservation Service is responsible for administering annually a \$150 million water resource program, including river basin and watershed planning and watershed and flood prevention operations. Because of the size and importance of this program and because one aspect of the program (channel work) recently has received a disproportionate amount of attention, SCS Information Director Hubert Kelley conducted the following interview with SCS Administrator Kenneth E. Grant. Administrator Grant reviews the current situation regarding channel improvement work in the SCS water resource program.

Question: Mr. Grant, no aspect of SCS work in recent years has created as much public controversy as has so-called "channelization" work in the small watershed program. Why is channel work so important?

Grant: Too often, channelization has been treated by its critics as if it were a total program. It isn't. Channelization is just one ingredient of water management in a small watershed project—and not every project at that. It is a way of moving water, whether you do it through a man-made channel, like a previously dug ditch, or through a natural streambed, so that it can be disposed of safely.

Question: Can you design a watershed project so that it doesn't require channel work?

Grant: That depends on the topography and other features of the watershed. Every project area is different; there is usually no pat solution to a problem you are trying to alleviate. Nearly one-third of the watershed projects approved for operations so far involve no channel work. In some parts of the country, however, the land is so flat that you can't impound water. In places like that, you have to depend on a channel to carry off excess storm water. You insist on good soil and water practices, but you also

have to have a channel as a central part of that watershed.

In other projects, a channel is just one part of a comprehensive plan—a plan that includes land treatment, like turning cropland on hillsides into pasture; impoundments to hold storm water; and, finally, a channel to move the water safely away after the storm is over.

You have to treat each project individually.

Question: A few critics have charged that SCS plans to channelize some 150,000 miles of natural, perennial streams in the United States. Any truth to this?

Grant: None at all. That figure has no basis in fact.

Question: Is most channel work concentrated in one part of the nation, or is it a widespread practice?

Grant: About 70 percent of the channel work planned or completed is in the South Atlantic and Gulf Coast states. No channel work at all has been planned in four states. And there are 15 more states that each

"All our contracts contain stringent provisions for controlling soil erosion during construction. Some clearing can't be avoided, but we do our best to get the area vegetated again as soon as possible."



have less than 50 miles of planned channel work.

Question: The public has heard a lot about how bad channelization is. What are some of the benefits of channel work?

Grant: One benefit is that you get excess water off agricultural lands—and other lands, for that matter. If you kept 3 feet of water out of your living room during Hurricane Agnes, I'd call that a benefit, wouldn't you? Another benefit is that we get water into channels to achieve more efficient water management on the farm. And we move water out so that it doesn't damage roads or recreational facilities or business firms. The purpose of a channel, as in all flood prevention work, is to make sure we manage the water all the way through a watershed to alleviate as much flood damage as possible.

Question: What about charges that clearing the banks on each side of a channel causes erosion and creates ugliness?

Grant: In many cases, we require contractors to fertilize and reseed banks almost daily. They also plant shrubs and trees as soon as possible to create new wildlife habitat. All our contracts contain stringent provisions for controlling soil erosion during construction. Some clearing can't be avoided, but we do our best to get the area vegetated again as soon as possible.

Question: Some critics insist that there are practical alternatives to channelization. Are we giving these alternatives proper consideration?

Grant: Again, it depends on the watershed. What we are trying to do is get as many people involved in the watershed planning process as we possibly can so that all the alternatives can be explored thoroughly. One alternative may be to build more impoundment structures or delay the release of water from impoundments so that it moves into channels very slowly. Another alternative is to dig only on one side of a channel, leaving the bank and vegetation intact on the other side. Or we can build pools and riffles in the stream to protect the fishery resource. Planners need to explore all the alternatives, and we insist that they do.

Question: But many environmentalists claim that, at best, channel work is terribly destructive to many of our beautiful, natural streams. How valid is this criticism?

Grant: A lot of these people don't understand the process of channelization very well. Some of the criticism has contained more emotion than reason. Actually, all the channel work completed in Public Law 566 projects to date involves less than 8,000 miles. Most of this mileage consists of man-made ditches or streams that only flow during part of the year. Only 18 percent—or about 1,400 miles—involves natural streams that flow all year long. Compare this small mileage to the estimated 3½ million miles of streams in this country and you can see that SCS channel work takes place on a very small percentage.

And you certainly couldn't call some of the natural streams we work on "beautiful," at least not in the way I define that term. Many of them are clogged with sediment, fallen trees and branches, all kinds of debris. Streams like that have lost their capacity to carry water away, and you have to restore or enlarge their channels if you want to prevent floods.

Question: But doesn't channelization do irreparable harm to the fish that live in those streams?

Grant: On those streams that flow only part of the year, the fishery resource wasn't there in the first place. On the natural streams, you have to look at each project on an individual basis. I know from personal experience of examples where channel improvements have been followed within a short time by a marked improvement in the fishery resource. In these places, fishing turned out to be better after channelization than it was before. You can't generalize about a thing like that.

Question: But I assume you are saying that in other instances, channel work has damaged the fishery resource.

Grant: In some places, yes—particularly on a short term basis. The long run may be quite different. In light of our experience with some 1,000 watershed plans to date, I think we have learned to examine every stream and look at all the environmental values involved before we begin work. Then, if the planners decide that a particular stream should not be touched, because of the fish and wildlife values, that may very well be the right answer for that particular project. In another instance, planners may find that the right kind of channel work can be accomplished, while protecting

"And you certainly couldn't call some of the natural streams we work on 'beautiful'. . . . Many of them are clogged with sediment, fallen trees and branches, all kinds of debris."

the fishery resource or even enhancing it. Then we can proceed with channel work.

Question: I gather that you are saying that channelization shouldn't be branded as good or bad, per se.

Grant: That's exactly what I am saying. To generalize that every time you enlarge or modify a channel you wreck a stream is a simplistic approach that doesn't jibe with the facts.

Question: What about criticism that the Public Law 566 program brings unneeded cropland into production?

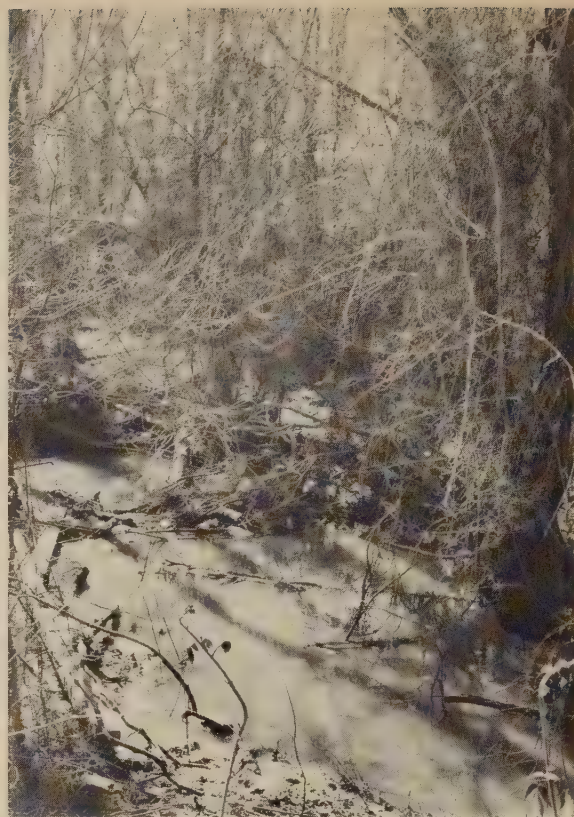
Grant: The truth is that in projects completed so far, there has been a net decrease in land used for row crops. Many farmers have shifted crop production from hillside acreage, where the danger of erosion is very high, to other acreage suited to crop production where you can control erosion. The small watershed program is a conservation program, not a land reclamation program.

Question: Has SCS made any changes in its approach to channelization since the wave of criticism against the practice began a few years ago?

Grant: Since passage of the National Environmental Policy Act of 1969, of course, we have been filing environmental impact statements on each new watershed project. Now we also are filing statements on some of the projects approved before the act became effective if they appear to be controversial. Also, we have reviewed all proposed channel work and have dropped or altered plans where the work might threaten fish and wildlife resources. So there definitely have been changes in our approach to reflect the heightened concern over environmental values.

Question: Some criticism of channel work has come from environmental groups that are fairly new on the scene. How do you feel about these newcomers to conservation?

Grant: Personally, I welcome the recent growing concern among so many citizens



over the condition of our environment. The Soil Conservation Service has been concerned about the environment ever since it began operations in 1935 during the Dust Bowl days. Our agency today welcomes the opportunity to work with these new environmentalists and to share experience and points of view. The result, I believe, will be to make the soil and water conservation program even more important environmentally to the people of this country.

Question: In your opinion, how can we clear the air and arrive at some sound thinking about channelization? How can we take the emotion out of the controversy?

Grant: If all the people concerned with the resources in a watershed would participate in the planning process—rather than sitting as judges later on—I am convinced they could arrive at reasonable solutions that will help them to reach most of their objectives. I think they can find ways to protect fish and wildlife and to reduce the frequency of flooding. That's the real challenge: to get federal and state agencies and local people working together to come up with the best possible plan after considering all the alternatives that are available. That's really what watershed planning is all about. ♦

Channelization —the farmer's friend

by James H. Canterbury
Area conservationist, SCS
Edenton, North Carolina

Mention channelization or stream-channel improvement today and you can get involved in a controversial subject.

Some conservationists and ecology groups have called channel work “environmental destruction,” but people in eastern North Carolina, who are also concerned about the environment, have quite a different viewpoint on channelization.

Channelization is nothing new on the flat coastal plains of North Carolina. To most farmers and townspeople channel work has long been necessary to drain the low-lying land, thus making farming possible and providing some protection from floods.

Channelization also is the only way to restore some natural streams. Roy Hollowell of Bertie County in eastern North Carolina, whose farm is in the Ahoskie Creek watershed, recalls: “As a boy, I remember a natural stream on our place that had several good fishing holes. They never went dry. Today that stream hardly resembles a stream—it has filled in with sediment and tree tops.”

A notable example of early channel improvement work is the Dismal Swamp Canal. George Washington began planning the canal in 1763. Construction began in 1790 as a joint effort between North Carolina and Virginia. The canal was designed to



Channel work was performed 6 years ago on this stream (above) in the Conetoe Creek watershed. Ozell Sessions (left), a farmer in the Ahoskie Creek watershed, believes that channelization has offered him a chance to make a better living.



provide water transportation between Albemarle Sound and Chesapeake Bay, but it also provided useful outlets for farm drainage systems.

Agriculture is the oldest and most important industry in eastern North Carolina. Pioneers on Roanoke Island probably were cultivating the soils in 1585. For them channel improvement was not necessary—the farming was on too small a scale.

But soon after the clearing of large areas and the introduction of the plow to the soil, natural streams began to change. Hundreds of small streams that had flowed free and clear were choking with sediment and flood-borne debris. Farmers found it necessary to clean out and improve the channels.

In modern times, channelization concerns both economics and a way of life. Ozell Sessions, a farmer in the Ahoskie Creek watershed, puts it this way: "Channelization offers me an opportunity to improve my eco-

nomic level. At the same time, well-planned channels can improve fish and wildlife habitat."

To Mrs. Katie Weatherly, domestic aspects come first. She says, "To a woman, the channel work that brought us protection from floods means no more mud and dirt in the house. No more green slime in the shrubbery and flowers. Without the watershed project we would have had to wade from the house to the road for at least a month."

She was referring to the Gum Neck Watershed Project in Tyrrell County. Project measures protected many farmers and landowners from floods in September 1971, when Hurricane Ginger dumped torrents of water on eastern North Carolina.

W. B. White, a farmer in the Pollock Swamp watershed in Chowan County and a commissioner of his drainage district, insists that channel work is necessary in most of the coastal plains area if farmers are to exist. "In my opinion," he says, "the

Edgecombe County leaders view a section of restored Ballahack Canal. Grass has grown along one bank, and trees and other vegetation are abundant on the opposite bank; the water flows freely.

logical approach is through Public Law 566—the Small Watershed Program. It provides total watershed development, including land treatment vital to reducing soil erosion—and we all know sediment is a menace to our streams."

Coastal plains farmers, deeply interested in their environment, do not understand the vehement opposition to channelization. Maybe because they know what it's like farming their land without the benefits of this water management practice. ♦

Kentucky city generates prosperity with water

Twenty years ago Elizabethtown, Kentucky, was a quiet rural community. Farming the fertile hills was the main concern of most of its 5,800 residents.

Today, little E-town has lost that small-town look; it is a prosperous, fast-growing city. Economists are predicting it may someday compete with neighboring Louisville as one of the largest metropolitan centers in the area.

"This prediction is understandable when you know the basic reasons for our growth," says James R. Pritchard, mayor of Elizabethtown. "Two major interstate highways meet at the edge of the city. Open land is available for city expansion. Even more important, we now have a water resource that exceeds our current municipal, industrial, and recreational needs."

E-town's future hasn't always looked this bright. A few years ago, its water resource—the foundation for current hopes—was the chief deterrent to the city's growth.

Floodwater from Valley Creek and its tributaries was a frequent and costly hazard for both city and rural people. In May 1961, for example, floodwater damaged 148 homes, 54 businesses, two

railroads, an interstate highway, and many farms, roads, and bridges.

Hundreds of people had to evacuate their homes. Transportation was disrupted and businesses closed. No lives were lost, but property losses within the city limits reached \$155,000, and similar losses were registered in the farming areas outside the city.

Average annual city flood damages had been \$42,000. Moreover, 43 full-time farmers suffered an average loss of \$120 each year, adding \$5,200 to the community's total annual loss from high waters.

Limited municipal water supplies represented Elizabethtown's expansion bottleneck. While the city had not yet experienced any real water shortages, increases in population were straining her supply, which came from two springs and a single deep well.

Recreational resources had reached a critical stage as well. The city had some small parks, but the nearest water-based recreation was 40 miles away.

In an all-out effort to solve these problems, the city of Elizabethtown, then under the leadership of Mayor Leonard J. Bean,

by Gordon S. Smith

Public information specialist, SCS
Upper Darby, Pennsylvania

joined with the Hardin County Soil Conservation District in sponsoring a watershed-protection project under the Federal Watershed Protection and Flood Prevention Program (Public Law 566).

The project plan, worked out with SCS technical assistance and approved by the Congress in April 1964, combined land treatment and floodwater dams in the 58,000-acre Valley Creek watershed to reduce flooding and harness water for municipal and recreational uses.

Soil-protection measures were installed by individual landowners with technical help from SCS and the Forest Service. Grassed waterways, stripcropping, tree planting, mulching, and other conservation measures were used throughout the watershed to reduce soil erosion and abate the flow of channel-clogging silt into the streams.

Three earthfill dams were planned as single-purpose struc-



Where do you want your water? In the streets . . .

tures—to hold back floodwater for safe, slow release after a storm. A fourth dam, a multiple-purpose structure, would both hold back floodwater and form a storage area for 300 million gallons of water for municipal and industrial uses in Elizabethtown. In addition, a 43-acre public park along one side of this 160-acre lake, with facilities for fishing, picnicking, and boating, would provide recreation for local people.

The Hardin County Fiscal Court's participation in the project was typical of the thoroughness of local cooperation. The court approved an allocation of \$45,000 for the project when construction was slowed by a lack of local funds to pay for

easements and land rights.

Even during construction, Elizabethtown residents had opportunities to see the advantage of a watershed project. Severe rainstorms hit the area when only two of the four planned dams had been finished. Nevertheless, floodwater did not enter the downtown business area. In the past, similar rains had severely flooded the town.

Unfortunately, several houses near a tributary in an area not then protected by dams were flooded during these storms.

More than 70 percent of the proposed land-treatment work was finished or nearly finished when dam construction began. Of the 454 farms in the watershed, about 400 were cooperat-

ing with the conservation district.

By the end of 1971, E-town residents saw other tangible results of their 7 years' work. The multipurpose dam was complete, and behind it, the 160-acre, 1¼-mile long Freeman Lake was filling up with millions of gallons of water for municipal, industrial, and recreational use.

The Freeman Lake Recreation Area was also ready. Today, a hard-surfaced road curves its way from the highway to a 100-car parking area. Lush grass and woods cover the 43-acre shoreline picnic area. For the future, 58 acres remain available for recreational development. Picnic shelters, stone fireplaces, drinking fountains, and restrooms dot the area. A caretaker's house is



or in a multiple-purpose lake.

nearby. Admission to the area is free. Fishing costs \$1 a day or \$5 a season. Row boats and pedal boats are rentable.

The Lincoln Heritage House, built 160 years ago, stands just above the new lake in the midst of the recreation area. Abe Lincoln's father, Hardin Thomas Lincoln, did the "joiners work" on the building. E-town recently raised \$18,000 to match a federal grant to have the house restored.

A \$795,000 municipal water-filtering plant was built in 1971 just below Freeman Lake. This facility uses the latest purification equipment and can process more than 3 million gallons of water a day.

"We had been buying 300,000

gallons of water a month from the county before this new plant went into operation," comments Mayor Pritchard. "Now the county will be buying water from us."

Elizabethtown is benefiting in other ways from its augmented water supply. Areas kept out of development because of insufficient water pressure can now be used for housing or industry. Four companies have built new plants in Elizabethtown. Fourteen other companies, already located there, have invested more than \$18 million in expanded facilities. This expansion and the new industry have created about 2,500 new jobs.

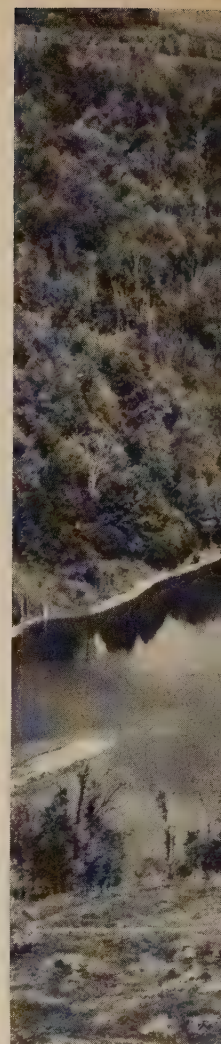
"This growth means much larger payrolls—and a larger tax

base for the city, which in turn means more money for schools and swimming pools and better roads and bridges," says Mayor Pritchard.

To cope with an expanding economy, the city is gradually annexing new land. In 1971, 4,500 acres were added to E-town, doubling its size.

The final cost of the project, as of its dedication October 4, 1971, was \$2,803,560. The city's part amounted to \$672,080, of which the county paid \$45,000. Federal funds paid the remainder. Economists estimate \$2.50 in benefits to Elizabethtown for every \$1 spent on the project.

Water is making E-town prosperous. ♦



**When Hurricane Agnes
reigned—and rained**



Dams like this in Wellsboro, Pa., spared many communities from serious flood damage.

Hurricane Agnes—one of the most ravaging storms ever to hit the United States—blew in and out last June, leaving death and destruction in its violent wake.

At least 118 people died, more than 220,000 had to be evacuated, thousands of homes were destroyed, and damage estimates ran into the billions. Robert M. White, head of the National Oceanic and Atmospheric Administration, called the flooding “the most extensive in the country’s history.”

What Agnes did *not* destroy, however, were the hundreds of dams in small watershed flood control projects located in the hurricane’s stormy path.

The dams, designed and built with the help of the Soil Conservation Service, were severely tested by the heavy rainstorms.

Not one of the dams failed under even the most severe conditions. Not one came close to failure. A conservative estimate of the damages they directly prevented, say SCS officials, is \$22 million.

Reports on the SCS-designed dams came from all over the Middle Atlantic states.

In suburban Montgomery County, Md., where the storm was of 100-year intensity, Lake Needwood and Lake Frank protected thousands of people downstream. SCS District Conservationist Lewis Williams estimated that the depth of floodwaters in many areas below the lakes was reduced one-third to one-half because of the lakes, which are part of the Upper Rock Creek Watershed Project.



Williams noted that "the serious flooding that did take place further down along Rock Creek could have been greatly reduced through small watershed-type protection; however, the area is now intensively urbanized and most potential damsites were pre-empted years ago."

In Pennsylvania, Agnes affected all of the state's 67 counties, and brought a flood damage bill exceeding \$2 billion. But towns like Hamburg, East Berwick, Westfield, New Ringgold, and Tamaqua escaped the brunt of the hurricane because small watershed projects were on the job.

The new (1971) multiple-purpose dam in the Mauch Chunk Creek Watershed Project saved the borough of Jim Thorpe, Pa., from more than \$1 million in flood damages. A dam for all reasons, it also provides water supplies and a 350-acre recreation lake for the community.

In Wellsboro, Pa., a happy Mayor William Hall reported that his town stayed dry, and avoided an estimated \$10 million in flood damages, through the Marsh Creek Watershed Project.

In contrast, nearby areas without protection had severe problems. Wrote a local reporter: "Residents of the Wellsboro region will never believe what happened to their neighbors in the Tioga River valley unless they see it for themselves. The reason is that the borough and surrounding area escaped untouched by the flooding and destruction that ravaged towns and villages less than 20 miles to the east.

"Upwards of 10 inches (of rain) fell in a 36-hour period . . . but the three main creeks that drain a large watershed above town remained in their banks."

SCS District Conservationist Donald Lindsey estimates that the Marsh Creek dams held back nearly 680 million gallons of water at the height of the storm. He noted that June 26—2 days after the storm—was the date for all work on the project to be accepted by county and SCS officials.

"These dams promptly paid for themselves several times over," said Lindsey, "and they even did it 2 days in advance!"

The southern part of New York state was also slammed by the hurricane. Dams in several watershed projects near the town of Binghamton did their job. Farmer Warren Zimmer of Broome County said of the dams in the Nanticoke Creek Watershed Project, "I think they saved us." The Ischua Creek Watershed Project near Franklinville prevented millions of gallons of floodwaters from rolling down into

the town. The Deer Creek Pilot Watershed Project in Tioga County, N.Y., protected that area. And the Conewango Creek Watershed Project's five completed or partially completed dams in Cattaraugus and Chautauqua Counties held back more than 446 million gallons of water and averted considerable damage.

Raymond Brown, Jr., SCS district conservationist in Cattaraugus County, cited a nursing home in Randolph, N.Y., as one example of flood protection to local citizens. "In 1967," he said, "a rainstorm of 4.72 inches forced elderly patients and the staff to evacuate the home. But during Agnes, when more than 6½ inches fell in the area, the patients were never threatened with evacuation. Dam 19 on Dattle Creek made the difference."

Brown points out that watershed projects protect fish and animals as well as people, noting that "the floodwaters and sediment smeared around on unprotected flood plains really got to the fish and wildlife. They need flood protection too."

In Delaware, farmers—already hard hit by heavy rains before Agnes—suffered severe crop losses. Jack Webb, who farms near the Upper Choptank River Watershed Project, said, "I have land improved by the watershed work, and I also have unimproved land. In the improved area, my drainage saved me \$4,500 on one farm alone. Where I didn't have drainage improvements because outlets weren't provided, I lost 90 acres of crops."

And another farmer, Isaac Thomas of Maryland, Del., said, "We had more than 8 inches of rain from Agnes. Without recent improvements . . . we could have had a 50 percent loss on all crops."

In Virginia, the savagery of Hurricane Agnes left at least 22 persons dead and damages estimated in excess of \$150 million.

The intense rainstorms reached a possible 200-year frequency in parts of Fairfax County, Va., near Washington, D.C. The Pohick Creek area in Fairfax had 11 inches in one 24-hour period. Lake Braddock, the first of the Pohick Creek Watershed Project's dam-created lakes, safely held back more than 150 acre-feet of water.

Charles Koch, district executive of the area's soil and water conservation district, explained that "what the lake did was to hold back the water and let it down slowly, so that, instead of water from a 100- or 200-year storm being added to the main stem of the Pohick, it was about like water from a 5-year storm—and that's a big difference!"



NBC-TV news people on a "washed" wheatfield in Pennsylvania.

"No wonder," said Koch, "that this has stirred a lot of interest in watershed projects elsewhere in Fairfax—a suburban county of almost half a million people."

In rural Prince Edward County, Va., dams in the Buffalo Creek Watershed Project prevented corn and soybean losses below the structures while crops in nearby unprotected areas were destroyed.

The Roanoke Creek Watershed Project in Charlotte County, Va., had 13 dams and about 20 miles of stream channel improvements fighting the flood and helping to keep water levels low. Where there are no flood-prevention structures or channel improvements to offer protection, high water closed roads and highways at 32 locations in the county.

The South River subwatershed project in Augusta County, Va., did its planned job of flood control on rural land and also gave the city of Waynesboro (population 17,000) about 25 percent flood protection, according to District Conservationist Wayne Hypes.

Hypes noted that Waynesboro had flood damages—"water up to the doorknobs in some places"—but without partial protection, the waters would have risen much higher.

"This flood has renewed local interest in getting the land rights for five more small dams in the area," he said. "With these in place, cityside protection would be almost 50 percent."

SCS District Conservationist David Poe of Culpeper County, Va., said that dams in the Mountain Run Watershed Project held back

Dozens of bridges
were washed away,
leaving many communities
isolated.



1.8 billion gallons of water during Agnes. Unlike nearby Rapidan and Remington, which were inundated, the town of Culpeper received only minor flood damage—and that, said DC Poe, will be controlled by planned additions to the Mountain Run Project.

As Claude Huffman, Culpeper's town manager put it, "There's no question that without the dams, Hurricane Agnes would have flooded the town with at least 2 more feet of water."

Virginia State Conservationist David Grimwood took an overall look at land damages in his state from a helicopter. "One of the things that really sickened me," he said, "was to look down at clean-tilled land above the dams. Fields without stripcropping and waterways were badly rilled and gullied, and you could quickly spot the sediment runoff patterns. I don't think a lot of people realize how much everyday conservation work pays off in an emergency like this."

The rainstorms of Agnes brought tragedy

to many people. Houses, crops, possessions were washed away.

The lesser known story, perhaps, is the number of personal and community tragedies reduced or prevented—and the lives very probably saved—because local people began working years before the storm to flood-proof their communities. They did it through good land use, flood-plain planning and zoning, and small watershed-type protection.

The rains came. The SCS-designed dams held.

The land treatment and channel work stayed on the job.

As SCS District Conservationist Wayne Hypes put it, "I'm really proud to be part of an organization and a group of people that can design and help to plan and build projects like these. They all came through in a crisis, just like the engineers said they would."—

CURRENT INFORMATION BRANCH, *Information Division, SCS, Washington, D.C.* ♦

The estimated total cost of 161 floodwater-retarding dams and 150 miles of channel improvement work in the Hurricane Agnes disaster area is more than \$38 million. This cost, including payment for land rights, is based on average cost rates for such structures and work in the Middle Atlantic region, as shown in the USDA Economic Research Service inventory of Public Law 566 watershed work plans approved in fiscal year 1971.

Of the 161 dams in the storm area, 127 are single purpose (flood prevention) and 34 are multiple purpose.

127 single-purpose dams at \$107,600 each	= \$13,665,000
34 multiple-purpose dams at \$583,300 each	= \$19,832,000
150 miles of channel work at \$30,400 per mile	= \$ 4,560,000
Total	\$38,057,000

The estimated damages prevented by dams and channel work amounted to \$22,206,000.

A dam in time saves and saves and saves

It was a good thing that the Montpelier Creek Reservoir was ready to store water in the spring of 1971. Without the 4,050-acre-foot storage capacity of the reservoir, the main street of Montpelier, Idaho, would have been under water from May 4 to the end of the month.

Periodic flooding in Montpelier and the surrounding farmlands has been a way of life since this southeastern Idaho community of 2,600 residents was first settled in 1863. The combination of damaging floods late in spring and the shortage of irrigation water in July and August was a real frustration to city dwellers, farmers, and ranchers.

The need for a dam on Montpelier Creek to store part of the otherwise lost spring runoff was recognized back in the early 1930's. A series of bad floods, starting in 1945 and recurring every 2 or 3 years, made it imperative that something be done.

In 1961, local people associated with the Montpelier Irrigation Company, the Bear Lake Soil and Water Conservation District, and the city of Montpelier requested the help of the Soil Conservation Service in putting together a small watershed project under authority of Public Law 566. The Montpelier Creek Watershed Project was the result.

The project was approved for construction in August 1964; construction began the following spring.

In addition to a multipurpose dam in Montpelier Creek canyon, the project included enlarging part of the irrigation company's canal system so it could serve as a bypass for floodwater from the watershed below the damsite.

Construction of a flood channel from the canal to the Bear River was also included, and the open channel of Montpelier Creek, which meandered through the community, was to be replaced with 54-inch reinforced concrete pipeline. This would eliminate the winter icing of the channel and the consequent overflow and flooding of the residential area adjacent to the creek. Modifying the irrigation company's delivery system was also included.

The dam was completed in the fall of 1970—and none too soon. The 1970-71 winter snowpack in the watershed was one of the heaviest in years.

Montpelier Creek began rising in mid-April and by May 4 had reached the point where flooding could have become a serious problem had it not been for the dam. The Montpelier Irrigation Company, following a carefully developed operations plan, controlled the release of water from the reservoir so that at no time during the 22 days of flood flow did the creek overflow.

James Olsen, mayor of Montpelier, stated that the dam and reservoir in its first season of operation saved the city thou-

by John S. Taggart

District conservationist, SCS
Montpelier, Idaho

sands of dollars in flood damage.

Recognizing the infallibility of hindsight, Phil Derricott, president of the Montpelier Irrigation Company, and Owen Stephens, the company's director, reflect that the dam should have been built back in the WPA 1930's when one of the presently largest dam-construction companies in the world offered to build it for \$80,000.

The dam cost \$1,500,000, under today's prices, but it probably is a more sophisticated engineering structure.

Work on the structural measures of the watershed project was pretty well completed by 1971. The Montpelier area faced the future with confidence and optimism. The threat of flooding had been removed, and water for late-season irrigation was a sure thing. ♦

A sight like this hasn't been seen in Montpelier, Idaho, since 1971—that year a watershed project dam was ready to hold floodwaters back.



People in the Lower Bayou Teche watershed, deep in the heart of the sugarcane country in southern Louisiana, say they like to live where there is abundant water. But they do something about it when there is too much.

The Lower Bayou Teche Watershed Project has made acres and acres of prime farmland safe from floods. And several towns in the 188,700-acre project area no longer are threatened by rising water in the streets.

This project has won national first-place honors for community development from the National Association of Counties. The many "side benefits" the project has brought to the area demonstrate its effectiveness.

Much of the marsh was unpro-



Sugar water

by Gene Warren

Public information specialist, SCS
Alexandria, Louisiana





(Opposite page, top) The Lower Bayou Teche Watershed Project made acres and acres of sugarcane land safe from floods.

(Opposite page, bottom) In improving this drainage canal, the original crooks were retained and trees were left along the banks.

(Above) The improved drainage canals have made the land more productive.

(Below, left) Some canals were widened and deepened. Boats can now go down to the Gulf of Mexico.

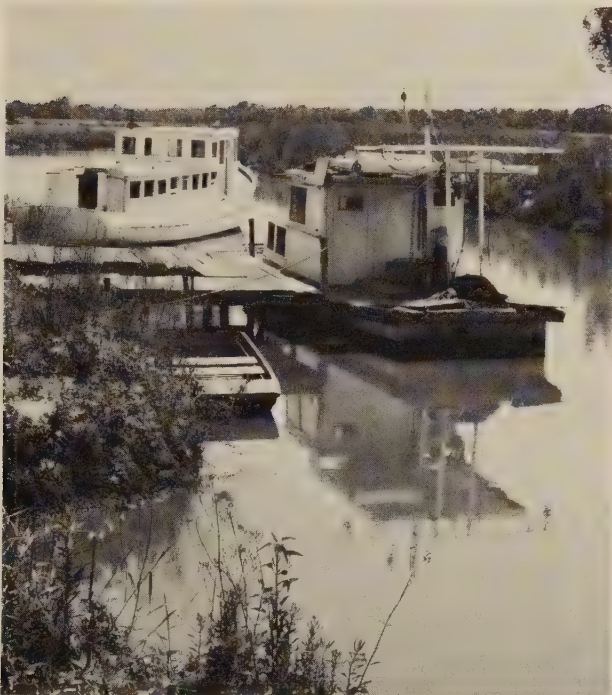
(Below, right) Harvesting crawfish is a common sight now in the parish. Many landowners used spoil dirt from the canals to impound water for crawfish, ducks, and other wildlife.

ductive before the watershed project. Now people can hunt, fish, trap, and bird watch there.

Also, the canals, which were built to carry excess upland water

through the marsh to outlets lower down, are deeper and wider now that silt and debris have been removed. Boats can travel up and down the waterways where they couldn't before.

Local people praise the Iberia-Vermilion Soil and Water Conservation District and the Iberia Parish Police Jury for sponsoring the project. And they speak well about the technical and financial help from the Soil Conservation Service and the Louisiana Department of Public Works. ♦



Paradise Valley, a land for people

by Sylvan T. Runkel

Biologist, SCS
Des Moines, Iowa

and Lynn A. Betts

Information specialist, SCS
Des Moines, Iowa

He had never camped, or caught a trout. His life was farming. Cattle roamed his woodlands, searching for good pasture. His barn held the sweet-smelling hay savored by his dairy herd.

That was Gene Schmelzer of rural Garnavillo, Iowa, 4 years ago.

Today, Schmelzer's hayloft has a juke box and pool tables. The milking parlor on the ground floor has been replaced by a laundry room and restrooms. And, instead of milking cows, the northeast Iowa farmer-turned-recreationist might be organizing a church service in the barn.

"No hunting" means all the visitors can enjoy the wildlife.



Schmelzer's land had a lot to do with his decision to change not only his occupation but his life style as well.

"Much of the land is Class VII, very steep," explains Roger Koster, SCS district conservationist at Elkader. "It shouldn't be pastured. It is ideal for hiking, horseback riding, and other forms of outdoor recreation."

Schmelzer, his wife, and two of their children have a full-time job keeping people happy at their 270-acre Paradise Valley.

"If you think farming is a family business, you should try a recreation business," Schmelzer says. "Each of us has principal duties, but we help one another, too. Our 10-year-old son, Kim, cleans the fish and helps with odd jobs. Carol Ann, who is 15, is trail boss. We've got 20 horses and a 6-mile trail."

Schmelzer's wife, Cecilia, manages their small store and is in charge of fish fries and barbecues. Schmelzer mows grass, fixes anything that's broken, trims trees, chops firewood, and keeps everything running smoothly.

"I like it, but it's a lot harder work than farming," Schmelzer admits. "You've got to be here all the time; there's always someone riding a horse, fishing, or

doing something. We've got horseback riding, fishing from two trout ponds, camping, hiking, paddleboating, swimming, and picnicking—outdoor activities people can do pretty much on their own. We organize group activities like hayrides when people ask for them."

Between 1,500 and 2,000 people came to Paradise Valley during the Labor Day weekend in 1971. Business tripled what it was the year before, and Schmelzer thinks it has been even better this year.

Is it difficult to convert to recreation from farming? "You start with nothing but ideas," says Schmelzer, "and you learn from mistakes. My biggest problem has been in thinking too small—right now I'm expanding shower and restroom facilities."

"This valley was nothing but a ditch and bull thistles when I let the milk cows have the run of the place," Schmelzer says. "It wasn't good pasture, nor good timber."

But it did have potential for recreation, according to Koster. The valley, only a half-mile from the Mississippi River, is one of several with fresh, pure drinking water from underground springs. The wooded hills are natural



wildlife and recreation areas.

Koster is hopeful that other farmers will think about converting some of their land to recreation uses. "The beauty of north-east Iowa attracts a large number of tourists," he explains, "and Clayton County is in the Upper Explorerland RC&D Project area, which has tourism development as a primary objective. If people get together on that project, they can make quite a few recreation enterprises work."

Koster helped plan the conservation practices for Paradise Valley. They included shaping the ditches into waterways; revamping two old ponds to make them suitable for swimming, paddleboating, and trout fishing; and building three erosion control structures. A 2,750-foot diversion terrace had already been

built to protect the barn.

Cost-sharing help for most of the practices was available from the Agricultural Stabilization and Conservation Service.

"Bill Ritter, a forester with the Iowa State Conservation Commission, has helped with tree plantings and has given me advice on woodland management," Schmelzer says.

"We don't allow hunting here, so we have squirrels, rabbits, deer, chipmunks, and other animals for campers to enjoy," he adds.

The riding trails probably will need reseeding periodically to prevent erosion, and there is still silt going into the valley's main stream. Talking to Gene Schmelzer, you get the idea these problems will be solved. He takes care of his land. ♦

This 270-acre recreation "farm" includes 180 acres of steep woodland that are better suited to recreation uses than to farming.

Review

Books

Soil Conservation. BY NORMAN HUDSON. 1971. *Cornell University Press* (124 Roberts Place, Ithaca, New York 14850). 320 pp. \$9.75.

The varied and vast amount of technical information contained in this well-written book reflects well the expertise of the author. Norman Hudson has been an erosion-control researcher in Africa and a univer-

Erosion and Sediment Pollution Control. BY R. P. BEASLEY. 1972. *Iowa State University Press* (Press Building, Ames, Iowa 50010). 320 pp., illus. \$11.95.

The author states that the primary purpose of this book is "to help conservationists develop the ability to analyze a given situation, determine the practices necessary for effective erosion control, and put these practices into effect on the land." To do this, he presents information on hydrology, hydraulics, and surveying. The book is mainly for use as a textbook for agriculture students in colleges and

sity lecturer in Africa and the United States. He is presently the head of the Department of Field Engineering and director of Studies in Soil Conservation at the National College of Agricultural Engineering in Silsoe, Bedfordshire, England.

Hudson's aim in writing the book is threefold: first, to provide a history and study of soil erosion and its treatment; second, to adapt world research and action methods of erosion control to developing countries that do not have highly

high schools, but others concerned with agricultural or urban erosion control may find it informative.

The Careless Technology. EDITED BY M. TAGHI FARVAR AND JOHN P. MILTON. 1972. *Doubleday and Company, Inc.* (100 Park Avenue, New York, New York 10017). 983 pp., illus. \$25.

This book presents data and case studies, from 70 internationally known scientists, showing how the bulk of international development programs

capitalized and mechanized agricultural industry; and third, to combine agronomy and engineering methods into an integrated whole for use of students of agriculture, forestry, geography, geology, and ecology.

The author succeeds in his objectives. The book should be a useful reference for students, scientists, and technicians who are or will be working in developing countries.—R. C. BARNES, JR., *agricultural engineer, SCS, Washington, D.C.*

have neglected ecological imperatives and thereby caused grave environmental problems. The 50 case studies represent the record of an international conference on the subject.

The book explores the relationships between technology in the Third World nations and the ecological strains that progress creates. It challenges the idea that developing countries should be overhauled by wealthier countries.

Contributors to the book include Barry Commoner, F. Fraser Darling, George Borgstrom, Lynton K. Caldwell, and Gunnar Myrdal.

New publications

Distribution of the Duck Harvest in Canada and the United States. BY AELRED D. GEIS AND F. GRAHAM COOCH. 1972. *U.S. Dept. of the Interior, Fish and Wildlife Service Spec. Scien. Rpt.—Wildlife 151*. 11 pp. \$0.25. Presents the distribution of the kill by species in the United States and Canada for the years 1967-69 based on mail questionnaires and wing collection surveys.

Field and Seed Crops—Usual Planting and Harvesting Dates by States in Principal Producing Areas. BY C. E. BURKHEAD, R. C. MAX, R. B. KARNES, AND E. REID. Rev. 1972. *USDA Agr. Hbk.* 283. 84 pp., illus. \$0.75. Contains information on the planting and harvesting dates for major field and seed crops. Dot maps show major

areas of production, and isomaps show periods of planting and harvesting for specific crops.

Alaska Trees and Shrubs. BY LESLIE A. VIERECK AND ELBERT L. LITTLE, JR. 1972. *USDA Agr. Hbk.* 410. 265 pp., illus. \$3.25. This handbook describes and illustrates 128 species in 54 genera and 19 plant families. It covers all of Alaska, however, this reference should be useful over a larger area in northwestern Canada, including the Yukon Territory, District of Mackenzie, and northwestern British Columbia. Most native woody plants of these adjacent areas are listed here.

Improved Spring Pastures, Cow-Calf Production, and Stocking Rate Carryover in the Northern Great Plains. BY W. R. HOUSTON AND J. J.

URICK. 1972. *USDA Tech. Bull.* 1451. 21 pp., illus. \$0.20. Gives the results of a grazing study that was conducted for 5 years in eastern Montana, comparing seeded pastures of crested wheatgrass-alfalfa and Russian wildrye-alfalfa with native range as spring pastures for Hereford breeding cows and calves. For the period 1964-68, the two seeded grass-alfalfa mixtures produced more forage with higher crude protein and with increased carrying capacity compared with that produced on the native range spring pasture.

Background on U.S. Agriculture. *USDA Leaflet 491*. Rev. 1972. Explains why modern farming and ranching, combined with a progressive system of marketing, processing, and merchandizing, is the nation's biggest industry.

Color Filmstrips and Slide Sets of the United States Department of Agriculture. 1972. *USDA Misc. Pub. 1107.* 17 pp., illus. Lists and describes filmstrips and slide sets covering many phases of agriculture and home economics; includes those prepared by the Soil Conservation Service. Gives instructions on how to order. For information write to U.S. Dept. of Agriculture, Office of Information, Photography Division, Washington, D.C. 20250.

The Hired Farm Working Force of 1971, a Statistical Report. BY ROBERT C. McELROY. 1972. *USDA Agr. Econ. Rpt. 222.* 30 pp., illus. Presents information on the size and composition of the 1971 hired farm working force and on the employment and cash earnings from farm and nonfarm wage work obtained during the year.

Planning Natural Resource Development—an Introductory Guide. BY GEORGE A. PAVELIS. 1972. *USDA Agr. Hbk. 431.* 30 pp. Describes and illustrates principles for making rational decisions on the scope, content, and scale of natural resource development programs; follows step-by-step phases of actual resource planning. This guide is mainly for public officials and others who do no actual planning but who make important decisions regarding projects.

Soil surveys

Seneca County, New York. BY FRANK Z. HUTTON, JR. 1972. 143 pp., illus.; maps 4 inches to the mile (1:15,840).

Hardeman County, Texas. BY K. T. LOFTON, EARL R. BLAKLEY, AND MARVIN L. DIXON. 1972. 84 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Lamar, Pike, and Upson Counties, Georgia. BY HUGH T. DAVIS. 1972. 67 pp., illus.; maps 4 inches to the mile (1:15,840).

Greenbrier County, West Virginia. BY JOHN L. GORMAN, LEONARD S. NEWMAN, WOODROW W. BEVERAGE, AND WILLIAM F. HATFIELD. 1972. 95 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Meetings

September

- 10-13 American Fisheries Society, Little Rock, Ark.
- 10-16 International Union for the Conservation of Nature, Banff, Canada
- 14-15 International Association of Game, Fish and Conservation Commissioners, Hot Springs, Ark.
- 18-20 International Commission on National Parks (World Conference), Yellowstone National Park, Wyo.
- 26-28 American Society of Civil Engineers, Irrigation and Drainage Specialty Conference, Spokane, Wash.
- 28-29 American Forest Institute, Boston, Mass.

October

- 1-5 Society of American Foresters, Hot Springs, Ark.
- 2-5 Association of Conservation Engineers, Durham, N.H.
- 2-6 Wilderness Society, Adirondack Mountains, N.Y.
- 2-6 National Association of Recreation and Parks (Annual Congress), Anaheim, Calif.
- 4-20 World Forestry Conference, Buenos Aires, Argentina
- 5-13 Food and Agriculture Organization Panel on Land Evaluation for Rural Purposes, Wageningen, The Netherlands
- 7-11 American Institute of Planners, Boston, Mass.
- 7-11 American Bankers Association, Dallas, Tex.
- 8-11 Farm and Industrial Equipment Institute, Boca Raton, La.
- 8-13 Water Pollution Control Federation, Atlanta, Ga.
- 11-13 Future Farmers of America, Kansas City, Mo.
- 15-18 American Chamber of Commerce Executives, Las Vegas, Nev.
- 16-20 American Society of Civil Engineers, Houston, Tex.
- 16-20 Association of Engineering Geologists, Kansas City, Mo.
- 21-22 The Nature Conservancy, New Paltz, N.Y.
- 21-27 International Commission on National Parks (2d Part), Teton National Park, Wyo.
- 22-26 American Forestry Association (also, Nationwide Tree Planting Conference), New Orleans, La.
- 25-28 National Association of Biology Teachers, San Francisco, Calif.
- 26-28 National Council for Geographic Education, Milwaukee, Wis.
- 29-31 Sprinkler Irrigation Association, Monterey, Calif.
- 29-Nov. 3 Soil Science Society of America, Miami Beach, Fla.
- 29-Nov. 3 American Society of Agronomy, Miami Beach, Fla.
- 30-Nov. 3 American Water Resources Association, St. Louis, Mo.

November

- 12-15 National Association of State Universities and Land Grant Colleges, Washington, D.C.
- 12-17 National Association of State Departments of Agriculture, St. Croix, Virgin Islands
- 13-15 Geological Society of America, Minneapolis, Minn.
- 13-21 National Grange, Hartford, Conn.
- 15-17 National Water Resources Association, Salt Lake City, Utah
- 16-20 Adult Education Association of the USA, Minneapolis, Minn.
- 26-30 National League of Cities, Indianapolis, Ind.
- 27-29 National Land Use Policy Conference sponsored by Soil Conservation Society of America, Des Moines, Iowa
- 27-Dec. 1 American Association of State Highway Officials, Phoenix, Ariz.

Recon . . .

The National Association of Conservation Districts is encouraging district supervisors to back the President's Environmental Merit Awards Program. The program, geared specifically to encourage students in elementary, junior, and senior high schools to become actively involved in environmental projects, will award certificates of achievement to students or groups achieving "a reasonable degree of success in understanding and/or acting upon environmental programs." Four areas of activity—educational achievement, environmental awareness action, community service, and public affairs—are covered by the program.

Interest-bearing Earth Bonds are being issued by an Arlington, Va., bank, and already a fund of \$1.2 million has been accumulated, says *American Forests* magazine. The Virginia bank matches invested funds dollar for dollar and loans the money to businesses, industries, and civic organizations for use in fighting land, water, and air pollution.

San Francisco's new rapid-transit system for the Bay area goes into operation in the fall of 1972. It will be closely watched for effects on commuter patterns. Will auto use in the cities decline? If urban mass transit systems can be improved, the effects on land-use patterns, urban sprawl, pollution, and resource depletion could be significant.

Grazing hurts fish habitat. According to a report on the Montana Rock Creek flood plain, a natural, free-flowing stream channel with heavily vegetated banks shows a better fish population—in numbers and variety—than a stream channel flowing through a heavily overgrazed area. In terms of pounds per surface acre, overgrazing cut productivity by well over 50 percent.

Sediment changes the paths of streams and rivers in predictable ways, according to findings from a study of a 100-foot model channel by geologists at Colorado State University. At low slope and low sediment loads, the artificial channel remained straight. When the channel was graded so that elevation changed 0.002 foot per foot of length, the deepest part of the flow zig-zagged. At steeper slope, the channel bottom assumed a braided appearance. The "river" meandered when suspended sediment was added.—*Science News*, June 10, 1972.

For the birds. More waterfowl is the principal aim of the new Water Bank Program. The program will concentrate initially on the northern part of the central and Mississippi flyways, the birds' north-south migratory routes. Ten-year agreements are being signed with owners and operators of eligible wetlands to provide habitat and nesting areas. States participating are North Dakota, Minnesota, South Dakota,

Montana, Wisconsin, California, Nebraska, Louisiana, Maine, Oregon, Mississippi, and Washington.

Not-so-instant landfill

Don Dinsmore, state conservationist in Maine, in comments about the article "Instant landfill—getting rid of trash for 20 cents a year" (*SOIL CONSERVATION*, May 1972), has pointed out that placing waste on excessively drained soils such as gravel pits can contribute to ground water contamination.

In some parts of the country, gravel pits are not safe sites for landfills because of soil materials, climate, or a high water table. The gravel pits mentioned in the article, however, are safe. Jim Eriksen, the district conservationist in Adams County, Nebraska, checked the soils at the site. He says that seepage is not a problem there because the landfill is on uplands where ground water is 90 to 110 feet below the surface.

Old gravel pits and stone quarries should be checked carefully before they are used as sanitary landfills. Soils that have a potential for ground water contamination from landfills can be sealed at the bottom in a way similar to that used for water impoundments.—Ed.

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SOIL conservation

October 1972, Vol. 38, No. 3

This month's articles are as varied as October foliage. The lead article discusses minimum tillage. Is it revolutionizing farming? To find the answer, Vincent Price, an Information Division writer, went to Woodford County, Ill., and talked to SCS people in the county, to county officials, and to the farmers themselves.

Other articles discuss a water management and erosion control system in Alabama, a girls' conservation camp in Wisconsin, a nature trail for the blind in Massachusetts, and an ASCS-SCS sponsored beef project in Michigan.

COVER: A chiseled field is a common sight in October in Woodford County, Illinois. The rough ridges and crop residue will protect the soil during the winter months. (See article on page 43.)

- 43 Minimum tillage: looks like a winner
by Vincent J. Price
- 46 Runoff goes underground
by Morris S. Gillespie
- 48 Conservation camp
by Cynthia Gleason
- 50 SCS conducts flood insurance studies for HUD
by Romeo A. Rivera
- 52 They touch the environment
by Henry J. Ritzer
- 55 Plant a pack of packeted plants
by Fred G. Aten
- 56 A package deal
by Fred Kekko and Ruth Hanson
- 58 Conservation in action
- 61 Recon
- 62 Review
- 63 Meetings
- 64 From the Administrator
Putting it all together

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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Minimum tillage: looks like a winner

It's called the tillage revolution. It's said to save the farmer time and labor. It's said to increase crop yield most of the time and to reduce soil erosion. It's said to conserve water and provide cover during winter.

Men who know farming speak of minimum tillage as perhaps the most important development in agriculture since hybrid corn. Some say that the American farmer can now throw away his moldboard plow.

Others are less certain.

A farmer in Woodford County, Illinois, looking over his field of soybeans—a field tilled according to the new method—expressed his personal doubts about minimum tillage as he winced from the glare reflecting off his combine. “You know,” he said, “those old methods—plowing and discing and harrowing—I’m still not 100 percent away from them. Our fathers and grandfathers knew no other way.”

Exactly what is minimum tillage? How has it revolutionized farming? In the Corn Belt minimum tillage often works like this:

After the harvest, the crop residue is chopped or shredded, and a chisel loosens and opens up the subsoil to create a series of rough ridges that help water

to soak in and prevent soil blowing. The crop residue, which remains on top of the soil, protects the soil from wind and water erosion during the nongrowing seasons.

In the spring, the farmer uses no-till equipment to apply fertilizer and herbicides and plant all in one operation. The soil is disturbed as little as possible; under some practices, it is opened up only to a width of 2 or 3 inches. Much of the residue from the previous crop remains on the soil as a protective cover. A field that is plowed according to the old method can lose many tons of soil per acre because the protective cover is buried below the surface.

Minimum tillage has swept across the nation in the last 5 years. Today, it is used on 1 out of every 10 acres planted to corn, soybeans, or sorghum.

In 1967 in Illinois, the Soil Conservation Service, the Cooperative Extension Service, and the Agricultural Stabilization and Conservation Service, through the Illinois Conservation Practices Committee, launched a program to promote minimum tillage. First they settled on a name for the practice—conservation tillage. (The practice is known

by Vincent J. Price

Information Division, SCS
Washington, D.C.

by several other names in different parts of the country.) They offered cost-sharing for the practice in 10 pilot counties. The immediate goal was to establish conservation tillage on 10 to 12 farms in each pilot county. It was hoped that the success of a dozen farmers would get the program off the ground.

Woodford County was one of the 10 pilot counties. Twelve farms began using conservation tillage in the county in 1967. Since then the practice has spread to more than 60,000 acres of county land.

Woodford County farmers who use conservation tillage do not all follow the same procedure. Do you have to shred the residue? What tillage implement should you use? Does it pay to further cultivate the soil after the original single tillage? Every farmer seems to have his own answers, and every farmer experiments.

“Last fall I chopped the stalks and put on fertilizer. I chisel plowed once. In spring I put on liquid fertilizer and herbicides;

then I planted with a no-till planter. I didn't do any cultivating after the planting." The speaker, Leland Klein, paused, and then continued, "I did cultivate some other fields, and it was cleaner where I cultivated."

Keeping his fields clean—preventing weeds from growing up around his crops—is important to Klein. There's some feeling that the undisturbed soil of conservation tillage is more amenable to weeds. And, as the SCS district conservationist in Woodford County, Henry Blunier, well knows, "If a farmer can't keep weeds out, he won't care about minimum tillage—he'll go back to plowing."

Most farmers in the county are satisfied with their weed control. Earl Bowald, for example, reported, "My tillage involves either shredding or disking stalks and chisel plowing in the fall. I get tremendous weedkill using this tillage system and chemicals."

A potentially more serious threat than weeds was posed in 1970 by corn blight. Would the 1970 corn residue infect the 1971 crop? "A lot of farmers were afraid it would, but it didn't," reported Blunier.

Other possible disadvantages of minimum tillage—increased insect pests and a cooler soil in spring—were not apparent in Woodford County.

There has been some question in the county about whether to shred or chop or merely chisel the residue. Running a chisel through a soybean field, it seems, is sufficient to break up residue, but some farmers feel that the heavier cornstalks should be shredded. Others have decided that shredding is an unnecessary expense.

Bob Kennell stated, "I used to shred but no more. It's not necessary." Leland Klein also is content to chop the stalks with a disc: "By spring the stalks pretty



much break down into the soil."

Blunier and the county extension agent, W. M. Sager, suggested that even chopping might not be needed. Sager said, "It's not necessary to chop the residue, provided the chisel is adjusted so that it will not be clogged by stalks."

There is no question about the advantages of conservation tillage. The advantage most farmers talk about is increased yield. Blunier admitted, "If a farmer doesn't think he'll get at least as high a yield as he would with conventional plowing, he won't try it." But Woodford County farmers, for the most part, are satisfied with their yields.

"One farmer," related Blunier, "used conservation tillage on part of his land and, with everything else the same, increased his yield by 8 bushels per acre. Now, that's not true everywhere, but I'd rather have them get 8 bushels more than 8 bushels less."

A second advantage is the savings in time and labor. There are the expected benefits from decreased use of tractors and other machinery, and the unex-

pected benefits, such as Bob Kennell got through decreased erosion: "We saved ourselves a lot of maintenance work on our waterways. Since we started this tillage, they've stayed in fine shape. In 4 years, no erosion, no sediment."

The biggest advantage lies in the protection that minimum tillage gives the soil. Earl Bowald, looking over his farm, put it this way: "This field has lots of little ridges in it, so erosion has always been a problem. Now, with this tillage, I can get the erosion under control."

About 30 percent of Woodford County is under conservation tillage, which means that about 70 percent is not. "The methods our grandfathers used are strongly implanted in many men," said Sager, the extension agent. "To us this new tillage method is a technical change; to others it's a social change."

So there is doubt and speculation about minimum tillage mixed with appreciation and enthusiasm. But early returns are in, and they indicate an eventual landslide for this revolutionary practice. ♦



A choice: a plowed field (top, left) and the sheet erosion and soil blowing that invariably follow; or a minimum tilled field (top, right) and a soil protected by a cover of crop residue.

A chisel (left): it opens up and loosens the subsoil, yet protects the topsoil.

The harvest (bottom): minimum tillage increased a farmer's corn yield by 8 bushels per acre.



Runoff goes underground

"I have always thought water could be handled underground better than above ground." These are the words of R. V. Crews, a crop and livestock farmer in the Piney Grove community near Geneva, Alabama, who recently installed an underground system on his farm for disposing of excess water without damage to his or his neighbor's property.

"Now the runoff doesn't wash

across my field eroding and carrying sediment and other pollutants to lakes and streams below," Crews said.

Crews previously had a terrace system that he said did not lend itself to the efficient use of modern farm equipment and allowed sediment to be washed from his field and deposited on his neighbor's land below. He also had vegetated waterways to carry water down the slopes, but some chemicals now used in farming destroy vegetation, making it difficult to maintain waterways.

In the new system, water collected by parallel terraces is carried to the bottom of a slope by a 6-inch underground plastic pipe.

Jimmy Holland, the SCS district conservationist, and other SCS people in the area helped Crews with the design and layout of his water management and erosion control system.

Holland said the system is designed also to promote better absorption of rain and reduce the loss of water through flooding.

Henry Miller, SCS state conservation engineer, said the system is being tried on a few other farms in Alabama; he thinks it will fill a real need in erosion control. "The cost of installing the underground pipe runs about the same, or a little higher, as that of constructing vegetated waterways, but the maintenance cost in future years can be much less," Miller said.

The installation of the pipe system on Crews' 15-acre field cost \$160, and that, Crews said, is less than the cost of a waterway. He also said that he could

by Morris S. Gillespie

Public information officer, SCS
Auburn, Alabama

not have established grass in the waterway because of the slope, the type of soil, and the heavy amount of water going into it. He said that without the pipe system, runoff water would cut ditches 4 feet deep; these would divide the field, and he would have to turn the large farm equipment around in the middle of the field. The ditches, Crews estimated, would have taken up 2 acres of good cropland.

"This new water-disposal system has not only helped me but also my neighbor, Tommy Davis," commented Crews. "Very little sediment is washed from my fields into Davis' fish pond. The water drains out slowly, allowing the sediment to settle out and stay on my field."

All of Crews' cropland is protected by the new system now except for 40 acres, and Crews has already asked SCS for help in installing the new system there next year.

Crews and his son farm 300 acres. They cultivate 100 acres; most of the rest is improved pastureland for their 70 head of Angus cattle. About 25 acres are in peanuts, and more than 75 acres are in corn and soybeans.

It is hard to see how Crews could have time for recreation, but he likes to fish in his two ponds. He believes people live longer if they take time out from work for fishing. One of his two ponds is stocked with shell crackers, bass, and bluegills and the other with catfish. ♦



R. V. Crews (left), an Alabama farmer, and Jimmy Holland, SCS district conservationist, are observing conditions at a spot where runoff leaves the field through an outlet pipe. A nonpolluting water management and erosion control system (top). The parallel terraces have a grade that directs excess water to the low point of the terrace. Extra height is added to the terrace at this point to act as a small dam to hold the collected water until it drains safely through a corrugated plastic riser outlet. An underground pipe carries the water from each terrace to the bottom of the slope.

Conservation camp

At many girls' camps the girls guide horses along wooded bridle paths or practice swimming strokes to pass proficiency tests; boating and handicrafts are everyday activities.

Not at the girls' camp in Wyalusing State Park, Wisconsin. There hardhats and heavy leather boots are standard equipment for the girls.

This park lies south of Prairie du Chien, where the Wisconsin River meets the Mississippi, in an area first seen by French explorers more than 300 years ago. The spot was chosen by the Wisconsin Department of Natural Resources (DNR) to educate girls in the field of conservation.

Wisconsin has always been a leader in conservation, and this girls' camp is one of the state's unique innovations. Last summer, in mid-June, for the fourth consecutive year, 60 girls gathered at Wyalusing for a week-long comprehensive study and action-oriented program.

Girls' Conservation Camp, the official name, was the original idea of Robert O. Ellingson, DNR chief of conservation education. Ellingson and the two other founders, John Semo, also with DNR, and Mrs. Rosemary Fleming, Dane County naturalist, chose a group camping unit at Wyalusing as the most practical location for the camp.

Since the first session in 1968, the founders, other conservation specialists, and former campers who return as counselors have been part of the staff.

Ellingson, coordinator of the camp, feels its success is due to the quality of students and staff. He said the girls welcome the opportunity to choose their own form of creative expression. Most

by Cynthia Gleason

Department of Natural Resources
Madison, Wisconsin



Pruning trees is easy?



How to fight a (simulated) forest fire.



Let's build a bird house.

of the girls who come to Wyalusing have shown interest in conservation through school or club activities; local conservation organizations often pay at least part of the \$60 fee.

Ellingson believes that women's roles in deciding environmental issues are very important. "Women are very sensitive to human needs and to individual rights," he said.

However sensitive the girls may be, they come to camp prepared to work. Last summer, they set up an archery range,

cleared trails, and cut trees and spread gravel to form a fire circle—all for the benefit of future campers. Nature studies, forest management activities, bird hikes, night watches, and time out for individual projects were also part of the week's schedule. The girls spent their spare time working on terrariums and plant collections, making spider cages, mounting butterflies, sketching, writing, and taking pictures for conservation groups at home.

Evenings at the camp were spent discussing opportunities

and educational requirements for careers in the environmental and conservation fields with specialists from the Soil Conservation Service and the U.S. Fish and Wildlife Service, environmental journalists, and others currently employed in conservation work.

What draws these girls to the woods? For most it is their genuine concern for the environment and their love of the outdoors. The program is designed to further the girls' interest in community conservation projects and to encourage individual environmental responsibility.

Several girls have decided to combine their interest in conservation with careers in other fields.

"For the girls who know what the word ecology means, camp is a great stimulation," said Mrs. Fleming, who has worked closely with the girls as a naturalist. "The girls become aware of community problems, and we try to help them determine solutions and develop the understanding that will be needed to make intelligent resource-use decisions in the future. In many different ways, they will be instrumental in leading the action." ♦

SCS conducts flood insurance studies for HUD

California has 114 of the 1,200 communities across the country approved for flood insurance to date under the National Flood Insurance Program of the Federal Insurance Administration (FIA), Department of Housing and Urban Development (HUD).

Established under the National Flood Insurance Act of 1968 (Public Law 90-448, as amended), this program makes flood and mudslide insurance, in specified amounts, available under federal auspices to property owners in approved communities. Such insurance was previously not available from private insurers.

After communities are approved for flood insurance, detailed studies are made to determine flood hazard zones. More than 400 of the communities approved for flood insurance still need to be studied.

To date, SCS has participated in 117 flood insurance studies in 33 states and Puerto Rico. Ninety-three of these studies have been completed.

Since May 1971, the Soil Conservation Service has completed flood insurance studies of four California communities: Walnut, El Cerrito, Portola Valley, and Thousand Oaks.

The California studies were made by SCS's river basins planning staff in Berkeley with the help of local area and work-unit personnel. Technical guidance was provided by SCS's engineering staff in the state and the Engineering and Watershed Planning Unit in Portland, Oregon, under the general guidance of the River Basins Division in Washington, D.C.

SCS became involved in flood insurance studies mainly because of its hydraulic expertise and the flood hazard information it collects in carrying out its regular programs.

Every 2 or 3 months FIA prepares a list of applicant communities approved for flood insurance and sends it to federal agencies interested in conducting flood insurance studies in those communities. These agencies are the Soil Conservation Service, the U.S. Army Corps of Engineers, the Tennessee Valley Authority, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey. The cost of obtaining the technical data, analyzing the flood hazards, and preparing a report is on a reimbursable basis from FIA.

FIA also contracts studies with state agencies and private engi-

neering consultants.

Study efforts are concentrated in critical, flood-prone urban areas, both developed and those having a potential for development. A study is usually completed in 6 to 8 months.

Flood insurance studies include data about and maps showing areas subject to inundation by 100-year and 500-year frequency-of-occurrence floods. FIA determines the insurance premium rates for the various flood hazard zones based on the relationship of the hydraulic and flood-frequency data (furnished by SCS) to depth-damage curves.

In carrying out a flood insurance study, SCS engineers and other specialists talk to city, county, and flood-control district officials, planners, and engineers and to flood-plain residents. They gather historical flood information, base maps, and streamflow and channel data. They survey cross sections of the valley and channel; make hydrologic and hydraulic studies to determine the 10-, 25-, 100-, and 500-year routed peak discharges at each cross section; and determine water surface profiles by automatic data processing programs.

The hydraulic data are analyzed, and a report is prepared for FIA. The report includes

flood-zone maps delineating four basic flood zones.

Any community, county, or township having legal authority to pass and enforce flood-plain land use and development ordinances and regulations is eligible to apply for flood insurance. Application is made by writing to the Federal Insurance Administration, Department of Housing and Urban Development, 451 Seventh Street, S.W., Washington, D.C. 20410 (telephone: 202-755-5284).

As soon as an applicant community becomes eligible, subsidized flood insurance for existing structures is available under the emergency program, pending completion of a detailed flood insurance rate study. At this point SCS, or one of the other agencies or firms, carries out a technical study to delineate the flood hazard areas.

Insurance coverage up to \$17,500 for single-family residences (including townhouses) and up to \$30,000 for all other structures can be purchased at once from any insurance company or agent licensed in the state. Maximum coverage of up to \$5,000 for household contents is also available to either the owner or tenant at subsidized rates. For example, the total pre-

by **Romeo A. Rivera**

Civil engineer
River basins planning staff, SCS
Berkeley, California

mium under the emergency program for the maximum coverage on a single-family residence valued at \$38,000, with \$12,000 contents value would be: House, \$17,500 (max.) x \$0.25 per \$100 coverage = \$43.75; contents, \$5,000 (max.) x \$0.35 per \$100 coverage = \$17.50; total annual premium = \$61.25.

All structures used for residential, business, religious, or agricultural purposes and structures occupied by nonprofit organizations or owned by state or local governments are eligible.

After a flood insurance study is completed in the community, additional coverage of \$17,500 on the structure and \$5,000 on the contents can be obtained at higher, actuarial rates.

Flood insurance studies are an important part of the national flood insurance program. SCS's technical contributions to this program are benefiting urban and rural areas and flood-plain residents across the country. ♦



**They touch
the environment**



by Henry J. Ritzer

Resource specialist, SCS
Amherst, Massachusetts

A troop of young girls moves down the shady trail through a Massachusetts woodland. One girl stops and wraps her arms around an old oak tree. Another girl reaches for a drooping, soft-needled branch of white pine and touches it tenderly. Two girls drop to their hands and knees and thrust their faces into a clump of sweet-smelling wild flowers. Voices ring with the delight of discovery.

Similar scenes occur several times a day at the 1,000-acre Robert Sever Hale Camping Reservation in Westwood, 10 miles southeast of Boston. Here, two interconnecting trails or loops are specially equipped to

unlock the wonders of the out-of-doors for the visually handicapped by stimulating their senses of hearing, smelling, and touching.

Unlike many nature trails for the blind, these are no easy walk through a manicured garden, nor are they intended only for the blind. Each year hundreds of sighted people also use the trails, which traverse almost a half-mile of rugged terrain that was left in its natural condition except for the removal of hazardous brush, stones, and holes.

At each of the 40 stopping points along the trails, message plates in both Braille and regular lettering have been mounted on

lecterns to describe the nearby natural elements. A special plastic rope, with feeler-markers to signal the stopping points, has been strung hip-high along the trails to help guide the handicapped hikers.

Further investigation at each step is invited by means of stout cords that lead to trees, shrubs, boulders, or rock outcrops. There are trees to embrace to achieve a sense of size; tree stumps with growth-rings to count for age; moss and fungus to run the fingers over; woodpecker holes to explore; a cedar swamp to moisten the hands and feet in; and aromatic clumps of plants such as sweet fern and sweet pep-



per bush to smell. On some days, the wind whistling through the branches of red pine and spruce trees adds to listening pleasure.

Popular with all hikers is a small level glade where fingers can explore a myriad of grasses and weeds.

In a pen at the end of the trails, which begin and end at the same place, there's a pet white-tail deer to nuzzle friendly hands.

The trails are the expression of many willing hearts and hands, according to Hale's executive director, James E. Earley. "The entire community is proud of this effort to bring nature awareness to the 10,000 sight-handicapped residents of Massachusetts," said Earley. "The project demonstrates the generous attitude of the 150,000 more fortunate people who come to the reservation every year for hiking, day camping, and outings."

Earley indicated that civic-organizations—notably from Dover and Westwood—donated materials, time, and labor to prepare the special trails. When funds were needed, the Massachusetts State Federation of Women's Clubs came rushing to the rescue. Materials for the two trails cost about \$1,000.

Such organizations as the Norfolk Conservation District and Boston Museum of Science helped with the trail-side educational features. Soil Conservation Service people at Acton provided a resource inventory and helped with the location and layout of the trails.

The entire project was done in close cooperation with the Massachusetts Association for the Blind. "We wanted to help the blind enjoy nature as fully as possible," said Tony Spinelli, assistant director of the reservation. "What we have here stresses the interrelationships of soil, water, plants, and animals in our environment not only for the blind but for all people." ♦

Plant a pack of packeted plants

The small plane banked, the wings glistened in the morning sun, and the Ohio landscape stretched out fresh and green 800 feet below.

The two passengers looked down with appreciative but critical eyes. "What we need in Ohio is some kind of wildlife planting program," said John Wilson, shouting above the roar of the aircraft engine.

That was in the spring of 1956 when Wilson, the SCS district conservationist in Ashtabula County, and a friend were touring the county by air.

During the flight, the one thing most apparent to both men was the fact that the county was not taking advantage of its enormous wildlife potential. They could see from the air that many farm ponds, which provide the nucleus for high-quality wildlife areas, were grassed but had no trees or shrubs close by for wildlife. Farm and rural homesites and most suburban areas also fell critically short in providing food and cover for wildlife.

The reforestation, wildlife, and beautification packet program, conceived that spring morning in an airplane, has spread across the state of Ohio and is now sponsored in every county by soil and water conservation districts. Packets are made up by the local districts from materials purchased from nurserymen.

Millions of people have taken advantage of this program; they planted nearly 1½ million trees and shrubs across Ohio in the spring of 1972.

"We need more organizations that are honestly interested in improving our environment,"

said one landowner who knows well the results of his 4-year-old plantings.

The packet-planting program has really progressed. New people in increasing numbers are buying packets each year as a result of their neighbors' successes, and old customers are coming back because of their own success with the plants.

"The people of the state have made this planting program a success—people on farms, people on small suburban lots, people everywhere interested in improving their environment," said Robert E. Quilliam, the SCS state conservationist in Ohio.

The seedling plants included in the packets have proved their adaptability and value in providing a tree where a tree is needed—for wildlife or simply to add

by Fred G. Aten

Area conservationist, SCS
Medina, Ohio

beauty to an area.

The plants in the packets vary somewhat across the state, but the primary plants are white and Austrian pine, Norway spruce, autumn olive, Canadian hemlock, arborvitae, larch, birch, American cranberry bush, and multi-flora rose.

This program, conceived in the skies, is making Buckeye land beautiful—Ohio is a better place to live in because of it. ♦

Mrs. John Michaels of Seneca County, Ohio, and her children start home with the wildlife planting packets purchased from the local conservation district.



A package deal



Is farming dead in Michigan's Covington and Watton communities? Indeed not! It's alive—and in a more beautiful and more prosperous setting than before, according to cooperators with the Baraga County Soil Conservation District.

Changes in this area, in the upper peninsula of Michigan, have occurred mainly because of a beef cow-calf project started 3 years ago by the Agricultural Stabilization and Conservation Service and the Soil Conservation Service.

The project is designed for package installation of all the conservation practices needed on a particular unit of a farm. Practices cover the areas of soil acidity, fertility, legume seeding, water control, and water storage. Cost-sharing funds are available through the Rural Environmental

by **Fred Kekko**

District conservationist, SCS
Houghton, Michigan

Ruth Hanson

County executive director, ASCS
L'Anse, Michigan

Assistance Program (REAP) for installing practices that are part of a conservation system.

The loam soils in the county have always had good potential. But when the dairy industry died out, many fields were abandoned and brush moved in. Some farmers became interested in beef cow-calf operations, but few could afford to get started in the beef business, that is, until the ASCS-SCS beef project got underway.



Birdsfoot trefoil pasture has replaced brush, rocks, and tree stumps in this field on the Stuart Delene farm in Watton, Michigan. Delene is shown with his son.

To bring about the change, the land needed lime, water control, and increased fertility. The main conservation practices applied through the project, therefore, have been sod waterways, liming, reseeding, fertilizing, and stock watering ponds.

Herman Tilson, Covington township supervisor, expressed the enthusiasm of the people taking part in the special project: "This project certainly has boosted our economy. It has proved that a comfortable living can come from beef farming in our county. When all the project measures have been completed and our fields are producing good grasses and legumes for hay and pasture, the number of beef cattle could easily be doubled."

Tilson worked hard to get the project approved and is part of it himself.

To get the project underway in 1 year required teamwork between the Soil Conservation Service, the Agricultural Stabilization and Conservation Service, the Cooperative Extension Service, conservation contractors, and landowners. Now, in the third year of this project, teamwork is still very much in evidence. It has been a big factor in the success of the project.

In 1970, 106 acres in 8 farms were planted to pasture. Vegetative cover improvement practices were applied on 47 acres in 4 farms. Five farms each got a stock watering pond, and waterway shaping and seeding were carried out on 21 acres in 8 farms. ASCS provided \$12,510 in cost-share funds for 33 practices.

In 1971, 18 farmers established new hay and pasture land seedings on 222 acres; improved

10 acres of vegetative cover with lime and fertilizer; constructed two farm ponds and 11 acres of sod waterways; and seeded 3½ acres of pond banks. REAP payments for 37 practices totaled \$11,600.

In 1972, \$16,300 were allocated to 18 farmers for establishing 230 acres of new pasture seeding, 12 acres of sod waterways, 5 livestock watering ponds, and 7 acres of pond-bank seeding.

"We have seen unsightly, brushed in, dying land turn into beautiful, lush, green areas," said Tilson in summing up his and his fellow beef farmers' appreciation of the project. "Until we became involved in this project, we never really knew how much we could benefit from the services available to us from ASCS, SCS, and other federal agencies." ♦

conservation

in action

Water--to have and to hold

For years, farmers in Kansas' Timber Creek watershed, which takes in Cowley and Butler Counties, had been doing their best to hold soil and water on their farms. But they couldn't do much to prevent floods.

The city of Winfield also had a problem. It had a long history of salty wells, which provided the main water supply. Several other towns, as well as rural residents, hauled water from Winfield, so the problem of salty water was widespread.

When the Watershed Protection and Flood Prevention Act was passed in 1954, people in the Timber Creek watershed began making plans that would eventually solve both problems.

The Cowley County Conservation District (96 percent of the watershed is in the county) offered to help sponsor a watershed district with the objective of holding more water in the uplands to reduce flood damage.

A watershed district was formed, and a work plan was completed in 1965 with the help of SCS's watershed planning staff. Construction began in 1967.

The work plan called for a combined floodwater storage of 14,324 acre-feet in 34 reservoirs. This was more water than the farmers in the watershed could use, so the idea of sharing this water resource with others outside the watershed was discussed.

The watershed district board invited Cowley County cities to

cosponsor a multipurpose project for city water and recreation. Winfield, tired of salty water, accepted with little inducement. It had been seriously considering an independent reservoir project on Timber Creek.

The 1,120-acre multiple-purpose Winfield reservoir was dedicated in the fall of 1970. One of the largest Public Law 566 watershed-project reservoirs in the nation, it has a conservation storage capacity of 25,000 acre-feet, of which 23,075 acre-feet are beneficial storage. This includes 5,000 acre-feet of floodwater storage, 9,075-acre-feet of municipal water for the city of Winfield, and 9,000 acre-feet for recreation use.

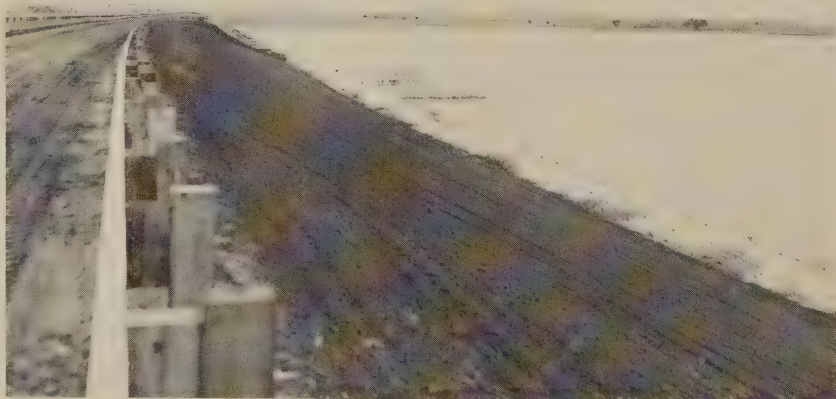
The approximate cost of the Winfield dam, including recre-

The Winfield dam forms a 1,120-acre reservoir, providing flood control, water supply, and recreation. A county blacktop highway has been relocated to go the length of the dam.

ation use, was \$2,173,000. The federal government shared about 48 percent of the cost under Public Law 566. An 8-mile pipeline to the filtration plant at Winfield and other features of the water system not part of the watershed plan were cost-shared by the U.S. Department of Housing and Urban Development.

About 869 acres of city land surrounding the lake are being turned into a public recreation area. Facilities include: picnic areas, fishing, swimming beach, boat ramps, restrooms, hunting areas, and wilderness camping.

The benefit-cost ratio of the entire project is \$2.30 benefit per \$1 cost. This project has affected the total environment for miles around. The two big problems have been solved: floods are being tamed, and Winfield and the surrounding areas have a new water supply. In addition, the public has an outdoor recreation center.—S. H. KELLER, *former district conservationist, SCS, Winfield, Kansas.* ♦



Effect of channel improvement on ground water studied

What long-range effects does channel improvement, as carried out in watershed projects, have on the supply of ground water in eastern North Carolina?

To answer this question, a study, covering parts of three counties and jointly sponsored by federal and state agencies, has gotten underway and probably will run through 1980.

Two Department of Agriculture agencies, the Agricultural Research Service and the Soil Conservation Service, are cooperating in the study with the U.S. Geological Survey and the Division of Ground Water, Office of Water and Air Resources, North Carolina Department of Natural and Economic Resources.

The 20-square mile study area is in the Creeping Swamp subwatershed in Pitt, Craven, and Beaufort Counties; it is within the Swift Creek Watershed Project area.

The Creeping Swamp subwatershed is part of the recharge area of the Castle Hayne aquifer, a major aquifer in eastern North Carolina affecting the water supply over a large area.

The ground water system underlying the Creeping Swamp subwatershed consists of two water-bearing strata. Nearest the surface is 15 to 20 feet of sand that contains some clay. The

Castle Hayne aquifer, immediately below, is made up of lime rock less than 50 feet thick. The amount of water discharged into surface streams from the upper sand can have an important bearing on the amount of water available for the lower Castle Hayne aquifer.

The study seeks answers to four questions:

(1) What effect will improved channels—with smoothed banks, straightened water courses, and no impediments—have on recharge to the upper sand aquifer and ultimately to the Castle Hayne aquifer?

(2) How will improved channels in one watershed affect ground water and streamflow in adjacent watersheds?

(3) Is it possible to accomplish surface drainage and at the same time increase ground water recharge to the Castle Hayne aquifer?

(4) To what extent will improved channels affect ground water discharge into a stream during low-flow periods, such as drought?

To find these answers, the cooperating agencies have set up three stream gaging stations and five rainfall stations and have installed a system of strategically placed observation wells to check the two water-bearing strata—the shallow sandy aquifer and the Castle Hayne limestone.

Data from these observation points will be used with ground water data to determine the net effect of channel improvement on the hydrology system of the subwatershed.

"We believe this study will not

only be helpful to us in North Carolina but also will provide useful information to people studying hydrology and related matters elsewhere," said State Conservationist Jesse L. Hicks. "We're looking forward to the answers as they come."—FRANK H. JETER, *public information officer, SCS, Raleigh, North Carolina.* ♦

Olympic-size pond

The town and village of Chatham and the town of Ghent, on the eastern shore of the Hudson River in New York, had no facilities for a summer youth program, so Arend Ooms and his sons, offered the 37-acre pond on their large dairy farm in Chatham.

In 1970, as cooperators with the Columbia County Soil and Water Conservation District, the Ooms had been assisted by the Soil Conservation Service in building the pond to benefit wildlife and provide family recreation.

The Ooms agreed to the use of their pond for the combined community youth program for the next 5 years.

Through the efforts of the communities and the pond owners, a beach and sanitary facilities were constructed in 1971. For 8 weeks that summer, an average of 60 youths used the pond 5 days a week—2,400 activity days

of swimming otherwise not available in these communities.

The success of the 1971 program prompted an expansion of activities for 1972. A larger staff gave instruction in swimming, and the season was expanded to 10 weeks.

The directors of the Columbia Conservation District recognized the Ooms' contribution by honoring them with a Conservation Civic Award.—JOHN C. TITCHNER, *district conservationist, SCS, Hudson, New York.* ♦

Living is easier

The people in Weakley County, Tennessee, believe in small-watershed projects. They have about 10 years of benefits on which to base their belief.

The Thompson Creek Watershed Project was authorized in 1958 and completed in 1969. Five floodwater-detention dams were built, 17 miles of channel were improved, 140 acres of bare

roadbanks were vegetated, and 2,019 acres of gullied land were planted to trees.

“Aside from the primary benefits—reduced erosion and floodwater and sediment damage—recreation opportunities in the county have increased manyfold because of our watershed project,” says Wayne Parham, chairman of the Weakley County Soil Conservation District.

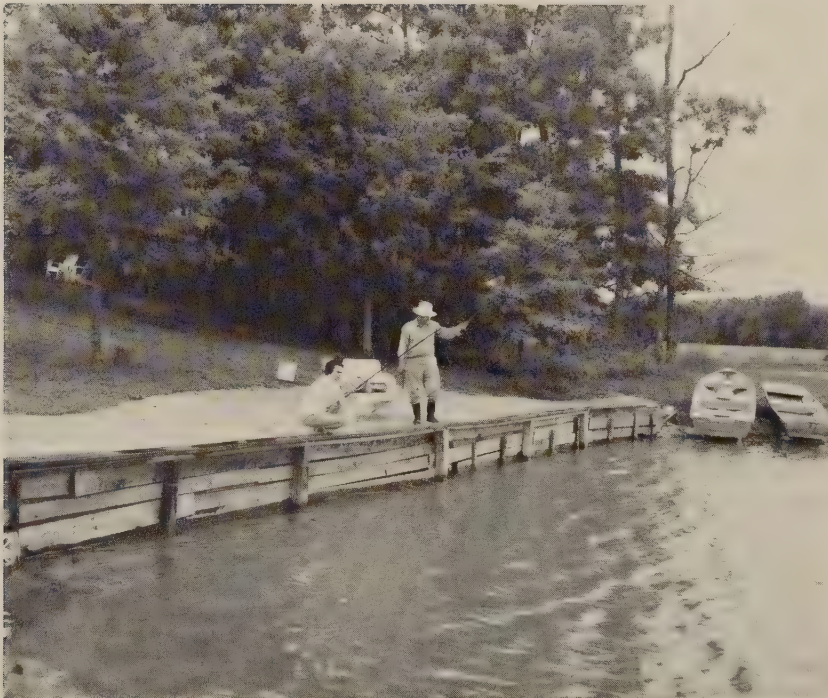
One of the dams, built with financial help from the Tennessee Game and Fish Commission, formed Garrett Lake, a multi-purpose lake that includes water supply for fish and wildlife.

Garrett Lake has boat docking facilities, a food concession, picnic tables, and restrooms. The area is used by Boy Scouts and Girl Scouts for camping.

All of the lakes provide fishing, boating, camping, and picnicking. The Tennessee Game and Fish Commission has stocked some areas with white tail deer. Many cottages have been built around the lakes.

“After 11 years we find that the Thompson Creek Watershed Project has proved far more beneficial to us than we could ever have imagined,” states Parham. “The indirect benefits alone have brought as much additional income into the county as a small factory would bring.

“This was surely a worthwhile investment for our efforts. And now we’re working on several other small-watershed projects that we know will be highly beneficial to the entire county.”—J. S. CORBITT, *former district conservationist, SCS, Dresden, Tennessee.* ♦



Fishing is one of the extra benefits that the Thompson Creek Watershed Project has brought to Weakley County, Tennessee.

A water-saving, pollution-free system of human waste disposal is being tried at South Dakota's Mt. Rushmore Memorial State Park, according to the *Dakota Farmer*. Instead of the usual 6 gallons of water per flush, the entire system operates with a total of 350 gallons of a low-viscosity, clear oil, continuously recycled. The wastes separate out of the medium and are then automatically transferred to a high-temperature incinerator, but they can also be tapped into an ordinary cesspool.

The Mt. Rushmore Memorial hosts up to 30,000 visitors daily during peak periods—about 2 million visitors a year. The new system is presently handling about one-third of the park's total. The system—whose main unit is about 6 by 6 by 6 feet in size—may have application in mountain cabins, farm residences, lake cottages, and even pickup campers and public campgrounds. The Black Hills Conservancy District is sponsoring the current 1-year trial.

Flash-flood warning. An automatic flood-alarm system is being set up by the National Weather Service. The first installation is going in near Wheeling, W.Va. Others will be operating within 2 years at Green Brook, N.J., Waynesboro, Va., in Wayne County, Ohio, and at sites to be chosen in several other eastern states. Triggered by an upstream water-level sensor, the alarm will automatically alert communities downstream.

Renew air and water. The retiring president of the American Association for the Advancement of Science, Dr. A. Spilhaus, said it in the weekly *Science*: "Just as we grow, use, and regrow food, we must continually clean, use, and reclean our

air and water. To the culture of our renewable plant and fiber crops, which we call agriculture, we must now add 'atmoculture' and 'hydroculture'—a continuing job of renewing air and water to good quality for reuse."

Fastest growing minority. On the day you read this about 4,000 Americans—two-fifths of them living on farms, in small towns, or in other nonmetropolitan places—are celebrating their 65th birthday. They join the ranks of America's fastest growing minority—the aging. In 1970, one of every 10 persons in the United States was 65 or over, and nearly one of every nine of these lived in nonmetropolitan places.

Soil-blowing may be dangerous to your health. Two Kansas State University researchers have checked rural dust levels throughout middle America. Near cultivated areas—not grazing lands—they say that airborne particulates have often exceeded the federal standard for "severe air pollution" by as much as 1,500 percent for up to 7 weeks annually.

Ammonia is always in the air. ARS reports suggest, however, that the amount is increasing in city and rural areas and is passing through the soil to add to the nitrogen load of our waters. Scientists have come up with hard evidence that plants actually metabolize ammonia for up to 10 percent of their nitrogen needs. The findings underscore the role of plants in decontaminating the atmosphere.

Conservation in China. In a recent article from mainland China, columnist Joseph Kraft focused on that nation's achievements in flood

control and soil conservation. More than 1,000 large reservoirs, tens of thousands of smaller upstream impoundments, and extensive application of conservation practices on the land were cited. The national symbol for all this is a now aged peasant, Chen Yung-kuei, whose mountain village in severely eroded southwest China is a model of conservation farming.

Ninety-one-year-old Charles Todd of White Cloud, Kansas, has received the Kansas Bankers Award for outstanding soil and water conservation on his 110-acre farm. Conservation practices established on the 40 acres of cropland include 3,192 feet of terraces, 3 acres of grassed waterways, and an erosion-control dam. Mr. Todd has lived on this farm all of his long life and has been blind for more than 10 years.

Rent-a-tree. In Germany, the owner of an apple orchard is reported to have met his labor shortage by renting trees to city people. For about \$7 a year, the renter can enjoy the tree and harvest its fruit, according to *Avant Gardener*, published in New York.

Fir feed. In a test in Washington, Douglas fir, specially treated, proved a palatable and nutritious feed for steers. The process, according to I. A. Dyer, animal scientist at Washington State University, consists of treating the wood to remove part of the indigestible lignin and to expand the cellulose molecules so the enzymes of the animal can digest it. The final product looks like finely cut silage. Animals fattened on it made daily gains of 2.7 to 2.9 pounds and had less backfat than similar animals fed barley or other grains.

Review

The Department of Agriculture. BY WAYNE RASMUSSEN AND GLADYS L. BAKER. 1972. *Praeger Publishers, Inc., 111 Fourth Ave., New York, N.Y. 10003.* 257 pp., illus. \$9. This book describes USDA's evolution from its beginning in 1862. It deals largely with the functions assigned to the Department as a whole, rather than with the functions of individual agencies. This way, explains Dr. Rasmussen, the text does not become obsolete when internal changes such as reorganizations occur in the Department. Chapters are organized around major functions such as research, regulation, education, conservation, production adjustment, rural development, and international affairs. The book also discusses USDA's relationships with other departments, Congress, and the public.

A Comparison of Lysimeter-Derived Potential Evapotranspiration With Computed Values. BY J. L. MC-GUINNESS AND ERICH F. BORDNE. 1972. *USDA Tech. Bull. 1452.* 71 pp., illus. \$0.40. Report compares data obtained through the various methods for estimating potential evapotranspiration (PET) with those from a lysimeter-derived "standard" PET curve as an aid to the selection of appropriate estimating methods for humid areas. It also incorporates in one place the computational techniques required by the various estimating schemes. Some of the estimating methods are arithmetically complex, and a "cookbook" approach to their solution should be helpful.

Saline Water Conversion Engineering Data Book. BY THE M. W. KELLOGG COMPANY FOR THE OFFICE OF SALINE WATER, U.S. Dept. of the Interior. 1971. 461 pp., illus. \$6.25. Contains technical data on the physical properties of the chemicals and materials being treated, derived thermodynamic data, phase equilibria, equip-

ment cost and economic factors, and design methods and standards.

Managing Our Environment. 1972. *USDA Agr. Inf. Bull. 351.* 48 pp., illus. \$0.65. The report covers some of the major environmental challenges facing scientists and regulatory officials working in agricultural research. Some of these challenges are: controlling sediment, animal wastes, and salinity; reusing sewage; properly using pesticides; and recycling food processing wastes. It discusses new ways to fight pests as alternatives to pesticides. And it points out that one of the challenges to scientists in agricultural research is to keep the landscape green. These scientists are concerned with the use of trees, turf, ornamentals, and related plants in protecting five environments: urban, suburban, transitional (areas that connect city and country), controlled (enclosed malls, offices, and museums, etc.), and rural.

Comprehensive Plans for Improving Rural Counties. BY ERLING D. SOLBERG. Rev. 1972. *USDA Agr. Inf. Bull. 316.* 10 pp., illus. \$0.15. Describes the need for a comprehensive plan—an overall pattern for development. The plan should show how a county can best use what it has to become the kind of place it wants to be. It specifies how present and future improvements and uses of land and other natural resources should be related and is a guide to both public and private development activities.

Saline Water Conversion Summary Report, 1971-1972. U.S. Dept. of the Interior, Office of Saline Water. 77 pp., illus. \$1. Provides information on the progress of the research and development of techniques and methods for desalting water. From the progress achieved to date, coupled with the advances realistically expected to be developed, desalination

should have a substantial impact on the future water resource programs of the nation.

Biology and Ecology of Two Predators, *Geocoris pallens* Stål and *G. bullatus* (Say). BY GEORGE TAMAKI. 1972. *USDA Tech. Bull. 1446.* 46 pp., illus. \$0.50. A 5-year project (1965-70) was undertaken to study the biology and ecology of these two omnivorous predator species in the Yakima Valley of Washington. Because they most frequently occupied the same habitat, rearing and interbreeding experiments were conducted to authenticate their status. This report gives the results of the study.

Report of the 1970 Workshop on Fish Feed Technology and Nutrition. 1971. U.S. Dept. of the Interior, Fish and Wildlife Service, Resource Pub. 102. 207 pp., illus. \$1.75. This publication is a comprehensive report of the results of a workshop organized by the Food and Agricultural Organization in cooperation with the U.S. Bureau of Sport Fisheries and Wildlife. The report is divided into three sections—fish food processing, fish culture techniques, and fish nutrition—and contains 25 articles by specialists in private industry, federal and state governments, and universities.

Biology of Rust Resistance in Forest Trees: Proceedings of a NATO-IUFRO Advanced Study Institute, August 17-24, 1969. 1972. *USDA Misc. Pub. 1221.* \$4. The proceedings contains 54 papers. Fifteen of the papers assay the world's white pines—their intrinsic qualities, relative blister rust resistance, and international exchange—and the rest of the papers covers forest rust resistance in general. These papers are by specialists from the federal and state governments and universities of the United States and from governments and universities of The Netherlands, Germany, Canada,

Austria, South Korea, West Pakistan, India, Japan, Denmark, Sweden, Belgium, and Mexico.

Disaster Preparedness. 1972. *Executive Office of the President, Office of Emergency Preparedness.* [348] pp., illus. \$2.75. This report establishes a broad-based and comprehensive analysis of disaster preparedness in the United States. It gives the findings of a study of the major natural disasters occurring in the United States and presents potential solutions to prevent or minimize the loss of life and damage to property in disasters. Ten types of natural disasters are examined—river floods, tornadoes and windstorms, hurricanes and storm surges, forest and grass fires, earthquakes, landslides, tsunamis, volcanic eruptions, frosts and freezes, and droughts.

Soil survey

Marshall County, Mississippi. BY M. C. TYER, W. E. BRIGHT, AND P. J. BARLOW. 1972. 70 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Yolo County, California. BY WELLS F. ANDREWS. 1972. 102 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Jones County, Texas. BY COLLETUS A. ROGERS, A. R. GOERDEL, AND H. D. GOOCH. 1972. 51 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Delaware County, Indiana. BY KELSO K. HUFFMAN. 1972. 66 pp., illus.; maps 4 inches to the mile (1:15,840).

Otero County, Colorado. BY ROY

J. LARSEN, DONALD R. MARTIN, AND M. BRUCE McCULLOUGH. 1972. 83 pp., illus.; maps 4 inches to the mile (1:15,840).

Genesee County, Michigan. BY SHELDON HOLCOMB. 1972. 113 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Meetings

November

- 12-15 National Association of State Universities and Land Grant Colleges, Washington, D.C.
- 12-16 National Water Resources Association, Salt Lake City, Utah.
- 12-17 National Association of State Departments of Agriculture, St. Croix, Virgin Islands.
- 13-15 Geological Society of America, Minneapolis, Minn.
- 13-21 National Grange, Hartford, Conn.
- 16-20 Adult Education Association of the USA, Minneapolis, Minn.
- 26-30 National League of Cities, Indianapolis, Ind.
- 27-29 National Land Use Policy Conference, sponsored by the Soil Conservation Society of America, Des Moines, Iowa.
- 27-Dec. 1 American Association of State Highway Officials, Phoenix, Ariz.
- 29-Dec. 1 National Conference of State and Federal Water Officials, Austin, Tex.

December

- 3-7 American Farm Bureau Federation, Los Angeles, Calif.
- 5-8 Western Forestry and Conservation Basin, Spokane, Wash.
- 6-7 National Association of Manufacturers, New York, N.Y.
- 11-15 American Society of Agricultural Engineers, Chicago, Ill.
- 13-15 Midwest Wildlife Conference, Des Moines, Iowa.
- 26-31 The American Nature Study Society, Washington, D.C.
- 26-31 American Association for the Advancement of Science, Washington, D.C.

January 1973

- 7-11 National Association of Home Builders, Houston, Tex.
- 10-11 National Council of Farmer Cooperatives, Orlando, Fla.
- 15-18 North American Game Breeders & Shooting Preserve Association, Inc., Topeka, Kans.
- 22-25 National Woolgrowers Association, Washington, D.C.
- 25-27 American National Cattlemen's Association, San Antonio, Tex.
- 26 National Highway Research Board, Washington, D.C.
- 28-Feb. 2 American Society of Civil Engineers, Water Resources Conference, Washington, D.C.
- 31-Feb. 3 Catfish Farmers of America, New Orleans, La.



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From the Administrator:

Putting it all together

Our authors this month didn't stick to a single theme; they wrote about such varied subjects as nature trails for the blind, beef-farming projects, minimum tillage, flood-insurance studies, and watershed protection.

In considering what kind of editorial would fit the issue, I found it difficult to categorize this variety of conservation action. But so is it difficult to categorize or define soil and water conservation today.

SCS employees and conservation district leaders are working today on an incredible array of activities that all come under the banner of conservation. At one time a district conservationist was likely to be spending his time making gully plugs, planting trees, building terraces. We're still doing these time-honored "nuts-and-bolts" jobs. But in addition, on any given day, a district conservationist working with people on the land may be involved in any one of the many subjects discussed in this issue—or several of them in the same day.

He has to have a much wider angle of view than may have been necessary a few years back. He needs to be no less a technician than he ever was—but a whole lot more of other things.

A well-trained district conservationist today has to be able to work with a whole jigsaw puzzle of natural resource needs and community interests. It's a puzzle that seems to have more and more pieces every day. The American landscape and the demands on it are more diverse, more complex, than at any time in history. Therefore the problems that local people and SCS

employees wrestle with daily are more complex, and these in turn make SCS programs more complex.

The common thread to all our varied activities is *people involvement*. Our district conservationists have to and do work with many kinds of people who have become involved in conservation action in different ways, for different reasons, and with different motives. Some people wish to use our services because they will benefit; some wish to help in conservation efforts to benefit other people or the community at large; some who do not necessarily want to use our services observe our actions.

Working with all these people and blending their interests to the natural resources at hand are challenges we all must meet. We need to place their concerns and ours in a perspective that brings mutual understanding. We need to be innovative, and encourage innovation, and place new issues and new conditions that arise into the right place in the jigsaw puzzle.

The result is a balanced soil and water conservation program that meets the total interest of America's communities.

Kenneth E. Grant

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U. S. Department of Agriculture/Soil Conservation Service/November 1972



SOIL conservation

November 1972, Vol. 38, No. 4

When land is abused, whether by overcropping or overgrazing, surface mining, or construction, it is to the plant kingdom that we turn for healing and protection. Over the years the Soil Conservation Service has helped introduce or improve many plants that benefit farmer, rancher, suburbanite, and urbanite.

This work of SCS is spotlighted in this issue of SOIL CONSERVATION.

COVER: A portrait of 'Latar' orchardgrass, one of the improved grasses developed by the SCS Plant Materials Center, Pullman, Washington.

- 67 The economics of new plants
by Vincent J. Price
- 71 A forb in your future
by Dale D. Allen
- 72 Bring back the grass
by Carl Wilker
- 74 Winners in Nevada—the motorists
by Norman R. Ritter
- 76 Emerald Sea—a new shore juniper
by H. W. Everett
- 78 Chemical tolerant switchgrass to help control water pollution
by Donald C. Smith
- 79 Nature's own pollution control device
by Erling T. Jacobson
- 80 Grass seed stripper under scrutiny
by Dale D. Allen
- 82 The dwarf goes Hawaiian
by Vincent J. Price
- 84 Plants have it rough in Arizona
by Wendell G. Hassell
- 86 Plants for California highways
by George Edmunson
- 87 Review
- 87 Meetings
- 88 From the Administrator
The search goes on

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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"The greatest service
that can be rendered any country
is to add a useful plant
to its culture."

—Thomas Jefferson

the economics of new plants

The loss of a rare or endangered species of plant is an unhappy event.

Conversely, the development of a new plant can enrich the environment and benefit us all.

A hard-nosed economist, however, might suggest that a new plant has no intrinsic value in itself. "Does the plant serve some commercial function?" the economist might ask. "What is it worth in dollars?"

To Bill Steiner, any new species or variety of plant can have tremendous economic potential. As chief plant materials specialist for the Soil Conservation Service, Steiner oversees the 20 SCS plant materials centers across the country. He points out that in the past 35 years SCS work has resulted in new plant varieties valued at literally millions of dollars.

"But their dollar value may be their least important aspect," says Steiner. "Environmental values are central to SCS programs, and our new plants are developed mainly for environmental

improvement—for their value in holding the soil, in preventing erosion and water pollution, and in stabilizing critical areas such as surface mined land and highway banks. Yet, often, the dollar benefits are also impressive."

Increased beef production

New forage plants developed by SCS for use on range, pasture, and haylands provide a soil blanketing groundcover; many have a superior root system that binds the soil tightly. The result is land that is well stabilized and less susceptible to wind and water erosion.

The protective cover can also

mean additional forage for livestock. The tremendous commercial value of these grasses and legumes can be illustrated by converting the improved forage into returns to the rancher.

For example, 'Latar' orchardgrass, one of the improved grasses developed by SCS' Pullman Plant Materials Center in Washington, is now commercially produced to the extent of 1,500,000 pounds of seed annually. That much seed will plant 300,000 acres of grass. Where properly managed, Latar will yield 3 tons per acre, so this year's seed crop can yield nearly 1 million tons of grass. When fed as hay or pasture, 1 ton of Latar produces 200 pounds of beef. Thus, 200 pounds \times 1 million tons = 200 million pounds of beef.

During the last fiscal year for which the U.S. Department of Agriculture's Statistical Reporting Service has figures (1970-71), Washington ranchers received an average of 28.7 cents per pound of beef. So, 28.7 cents \times 200 million pounds = \$57,400,000.

by Vincent J. Price
Information Division, SCS
Washington, D.C.

Of course, cattle would have eaten grass from that acreage anyway. But Latar is 10 percent more digestible than common orchardgrass, and this increased digestibility is where the commercial value of the new grass lies.

This 10 percent increase in digestibility equals \$5,740,000. Since the life of a pasture planting is 5 years, the total increased returns from this year's seed crop can be more than \$28,700,000.

Annual seed production by commercial growers of improved grasses developed and released by the Pullman Plant Materials Center is in excess of 3 million pounds. The value of this seed is more than \$1.5 million, which is more than the cost of operating the center for 15 years.

'Meechee' arrowleaf clover also has brought impressive results. Developed by the SCS Coffeeville Plant Materials Center in Mississippi, Meechee produces most of its cover after crimson clover has seeded out and before the warm-season forage plants have produced much growth. Not only does Meechee arrowleaf clover protect the soil during this period, but also it represents an increase of 100 to 125 pounds of beef per acre over production on the same land without Meechee.

There are an estimated 20,000 acres of Meechee arrowleaf clover in the tri-state area of Mississippi, Arkansas, and Louisiana and additional acreage in Alabama, Texas, and Oregon. According to the Mississippi Department of Agriculture and Commerce, the current cattle-on-the-hoof price in Mississippi is about 40 cents a pound, making the value of beef produced on Meechee in the tri-state area approximately \$800,000 to \$1 million a year. This is almost double the operating costs of the Coffeeville Plant Materials Center for the last decade.

"Hay on the land"

Selection 75 kleingrass, a new grass developed at SCS' Knox City Plant Materials Center, Texas, may prove as valuable as Meechee or Latar.

About 100,000 acres of the grass have been planted in Texas since 1968; about 4,000 acres were harvested for seed this year. Estimates from Texas SCS work

Harvesting 'Latar' orchardgrass seed in Oregon. One and a half million pounds of seed are harvested each year.

units are that the 4,000 acres produced about 170,000 pounds of seed, which retailed at a variable figure, averaging about \$6 a pound. Thus, the value of seed harvested this year may be slightly in excess of \$1 million.

What are the virtues of Selection 75 kleingrass, known in Texas as "hay on the land?"

Conservation district cooperators in the state are reporting annual hay and forage yields ranging from 4,500 to 10,000 pounds an acre. Joe Tate, the SCS district conservationist in Caldwell, Texas, said, "Klein-



grass 75 has given this area an improved grass for both the growing season and the dormant season. Livestock is the number one industry in Burleson County, and this grass can increase production and decrease the amount of hay needed in winter.

"I estimate the overall income derived from kleingrass 75 in my county to be \$140,000, with a potential of 10 times that within 3 years."

Use of 'Latar' orchardgrass has resulted in increased beef production.

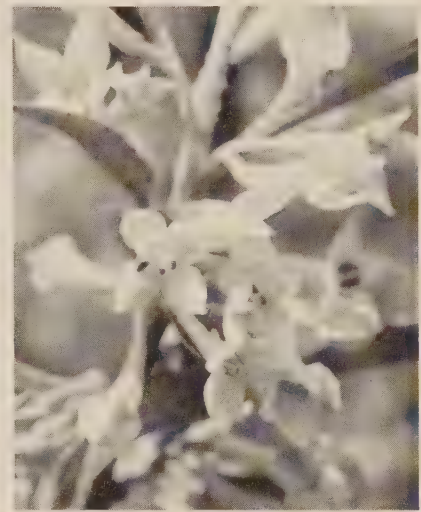
Songbirds and surface mined land

'Cardinal' autumn-olive, a plant originating at the National Plant Materials Center in Beltsville, Maryland, and field tested by the Big Flats Plant Materials Center in New York, stabilizes critical erosion areas, including highway cuts and surface mined land, and is a prime wildlife plant. It provides food and cover for many types of birds and animals.

"We haven't any hard and fast figures on Cardinal autumn-

olive," said Steiner, "but a reasonable estimate of present annual production, commercially and by state governments, would be 8 to 10 million seedlings. The current price of commercial Cardinal autumn-olive stock is \$125 per thousand seedlings. Taking the figure of 8 million seedlings, we're talking about a commercial value of \$1 million a year in seedling production."

Autumn-olive provides such intangible economic benefits as natural esthetics (below) and wild life food (bottom).



What's a warbler worth?

From the standpoint of market value alone, an autumn-olive seedling is worth 12½ cents. But this price tag does not include the environmental value or other values of a full-grown shrub.

A full-grown shrub will attract songbirds. How much is a songbird worth? Lawrence Compton, SCS chief biologist, answered, "It's completely unrealistic to put a price tag on songbirds. To do that you first have to put a price tag on man's esthetic enjoyment. What's it worth? I don't know. No one does."

Stabilizing critical areas

The same is partially true of stabilizing and reclaiming surface mined land. 'Arnot' bristly locust, a plant developed at the Big Flats Plant Materials Center, is used almost exclusively for stabilizing the most critical mine spoil areas and highway road-banks.

Last year, a U.S. Department of the Interior environmental impact statement on reclaiming mined land noted, "A cost-benefit analysis of this program is hampered by the fact that most of the benefits cannot readily be appraised. Cleaner water and air, more esthetic countryside, and better recreation facilities are real values even though difficult to measure in precise dollar values."

Arnot bristly locust is a recent release of the Soil Conservation Service. In 1971 only 400 pounds of seed were collected from all sources. Of this, 300 pounds went, through conservation districts, to commercial nurseries for seedling production. The seedlings produced this year can stabilize 1,000 acres of very critical mine spoil in 1973.

What is the economic and esthetic value of 1,000 acres of spoil areas that have been stabilized?

For one thing, the amount of sediment going into nearby waterways is reduced when mined areas are stabilized. A U.S. Geological Survey study revealed that surface mine spoil in one area of Kentucky produces about 1,000 times the sediment of neighboring, undisturbed land.

Arnot bristly locust can stabilize a surface mined area in 4 to 5 years; most tree species now used for stabilization must grow 10 to 20 years before they can effectively protect the soil. This ability of Arnot to stabilize mined areas 5 to 15 years sooner than trees can mean major reductions in sediment runoff.

A precise benefit-cost break-

down is not possible, but environmentalists and economists can both agree that the nation has benefited enormously, since the estimated direct cost of developing Arnot bristly locust was only \$11,500.

Of course, not every plant SCS works with is profitable. "There's some lost motion in developing conservation plants," Steiner admitted. "We screen thousands of plants and may come up with only one good one for a specific purpose. But once that plant is developed, it assumes great importance. An investment—say \$10,000—is made only once, but the economic, environmental, social, and esthetic benefits continue over the years."

And even the hardest nosed economist will admit that that's a good investment. ♦

Selection 75 kleingrass—increased production and decreased costs.



A forb in your future

To borrow from a well-known auto sales slogan, there may be a forb in your future.

But you can't buy it yet.

Work underway at the Soil Conservation Service's Plant Materials Center at Knox City, Texas, however, may change that.

Sportsmen, wildlife enthusiasts, and livestock producers are among those wanting forbs.

Forbs are broad-leafed, herbaceous plants. Several species native to Texas are highly relished by wildlife and livestock. Some, such as englemann-daisy, have become rare across broad areas of the state because they were killed by overuse.

Seed for forbs, including several native legumes, is badly needed for use in range seedings, wildlife plantings, border plantings, wildlife travel lanes, nature plantings, and other uses.

Such seed, however, cannot now be bought through commercial outlets.

Plant specialists think two

An aerial view of the SCS Plant Materials Center at Knox City, Texas.



by Dale D. Allen

Public information officer, SCS
Temple, Texas

problems need to be solved before choice forbs will be grown by commercial seed producers.

First, plants vary in their inherent vigor and growth characteristics, even within the same species growing in the same area. SCS plant materials work is aimed at selecting specific strains of grasses and forbs with superior growth traits. Promising strains are then field-tested on farms of soil and water conservation district cooperators.

So the first hurdle is to select superior strains of forbs for release to commercial seed growers.

But here's a second problem. There is little technology available on how to grow forbs. Commercial seed growers need to know how to manage such plants for maximum seed production; how to harvest the seed; how to control insects; fertilizer needs; and other cultural requirements.

Plant materials specialists are now trying to develop this technology.

Forbs being grown at the 70-acre plant center at Knox City include selections of englemann-daisy, Maximilian sunflower, bushsunflower, and halfshrub sundrop.

Native legumes under evaluation include strains of trailing wildbean, least snoutbean, prostrate bundleflower, prairieclover, and western indigo.

The forb or legume in your future may be any of these.

And plant scientists hope the seed will be on the market soon. ♦

A hundred years ago—in September 1872—Lt. R. L. Hoxie, U.S. Army, was passing through Bear Valley, Utah, as a member of the Wheeler mapping expedition. In his diary one night, the young officer wrote with enthusiasm of the abundance of grass in the valley, of the many beaver dams, and of the fine trout in the clear-flowing stream.

Even earlier another visitor to the area, Orville C. Pratt, had recorded: "Camped today on Sevier River near Salina after marching 10 miles and found the grass very good. The men caught some of the finest trout here that I ever saw . . . some of them weighing at least 4 pounds. The valley of the Sevier, where we struck it, is the finest I have seen. . . ."

If the two men were writing of conditions today in the broad basin of the Sevier River, they scarcely would have mentioned the grass or the flowing streams.

Sagebrush and pinon-juniper now dominate the area's rangeland. Bear Creek runs only a part of the year. Gullies and washes are a vivid reminder of past land misuse and an eyesore to all who see them. The Basin has had hard use and abuse in the past century.

There were few grazing animals in the Sevier Basin in pioneer times. Fires started by lightning or set by Indians evidently burned unchecked, eliminating most of the brush and other woody plants. Grass and other forage plants had every opportunity to become abundant.

When domestic grazing animals moved into the Sevier, their heavy use of grass, along with occasional dry seasons, made conditions favorable for the sagebrush and juniper that are now predominant.

To the casual observer, the

bring back the grass

by Carl Wilker

Resource conservationist, SCS
Richfield, Utah

sagebrush and juniper may present a pleasant sight. To the cattlemen and sheep raisers, they present a less attractive picture because they tend to crowd out grass and other more useful plants.

It is true that pinon-juniper yields good posts, can be cut for Christmas trees, and has an edible nut. The sagebrush, however, has very little in its favor. Its feeder root system prohibits understory growth and often leaves the soil bare. The result is increased erosion and deterioration of the soil resource.

Sediment from this erosion pollutes streams and reservoirs, piles up in irrigation ditches and on farmlands, and covers roads.

Conservationists, including

professional ecologists and farmers and ranchers, know that brush-covered rangelands can be improved by conservation management. All stockmen want some browse plants on the range, but they want them in proper balance with grasses and forbs.

Pinon-juniper now covers 358,000 acres in the Sevier River Basin, and sagebrush, about 396,000 acres. Replacing these low-value woody plants with grasses and forbs, followed by proper range management, can increase grazing in the Basin by around 160,000 animal-unit months. (An animal-unit month is the forage needed to feed a thousand-pound cow for a month, or the equivalent in other animals.)

Similarly, improved vegetative cover and other good management practices could also increase the food supply of upland game birds.

Chaining effectively and economically controls the growth of sagebrush and pinon-juniper.



With erosion reduced in the Basin through conservation management of the land resource, there would be less sediment to pollute the area's streams, reservoirs, and ponds. Sediment-laden water now reduces the food supply of fish and waterfowl. In some cases it also contaminates the water supplies for towns.

Brush management — which does not imply its eradication — means more abundant and vigorous grasses in areas best suited to grass production. Brush control frequently increases usable forage production manyfold for several years. The close-growing grass, replacing the brush in areas of accelerated soil erosion, holds the soil in place and conducts water into the soil to feed springs and stabilize streamflow.

Woody plants, such as sagebrush and pinon-juniper, are water-greedy. Studies show they transpire about 1,000 pounds of moisture for each pound they add to their dry weight. This is moisture that could be used by grass and other grazable plants.

Sagebrush and juniper can be effectively and economically controlled by chemical spraying, plowing, or chaining. Oliver Anderson & Sons of Glenwood used 2-4-D sprayed by helicopter on their range near Fish Lake in Sevier County. Parker Mountain Grazer's Association used the same chemical in their state land lease in Wayne County. The dense stands of sagebrush on both units have been replaced with excellent groundcover of valuable grasses and forbs.

The Fayette Grazing Association, in cooperation with the U.S. Bureau of Land Management, has chained and reseeded almost 5,000 acres of private and federal lands, and Glade Mower has chained and reseeded 1,500 acres in Sanpete County. These four projects are examples of the

range improvement that can be obtained by brush control.

Conservation management of lands now in sagebrush and juniper in the Sevier Basin can add greatly to the economy of the people in the area. Further, it will protect and improve the soil, a vital resource that has suffered much harm since Lt. Hoxie first traveled to the grasslands of Utah.

Who knows? Perhaps the Basin will again produce the kinds of grass and grazing plants which impressed the early traveler. Perhaps, once again Bear Creek and the other creeks in the Sevier Basin will be clear, clean,

Low-value big sagebrush (top) on thousands of acres in the Sevier River Basin.

(Above) Feeder root system of heavy juniper stand prohibits understory growth and often leaves the soil bare.

year-round streams teeming with defiant trout.

To the land users in the Basin, and particularly to those cooperating with the soil and water conservation districts serving the area, it is a real and completely attainable goal. And, they remind you, it is a goal well worth working for. ♦



Winners in Nevada

--the motorists

Nevada motorists, take note: the state's newest highways, their shoulders and drainage-ways grass-carpeted and neatly trimmed, are looking great. Road-side erosion control now receives the careful attention of highway engineers, architects, and designers.

A cooperative agreement between SCS and the Nevada Department of Highways, the state's largest agency, has paved the way for SCS help in reducing soil erosion during highway construction. Soil maps provided by SCS are a major help in deciding which plants to use in a specific

by Norman R. Ritter

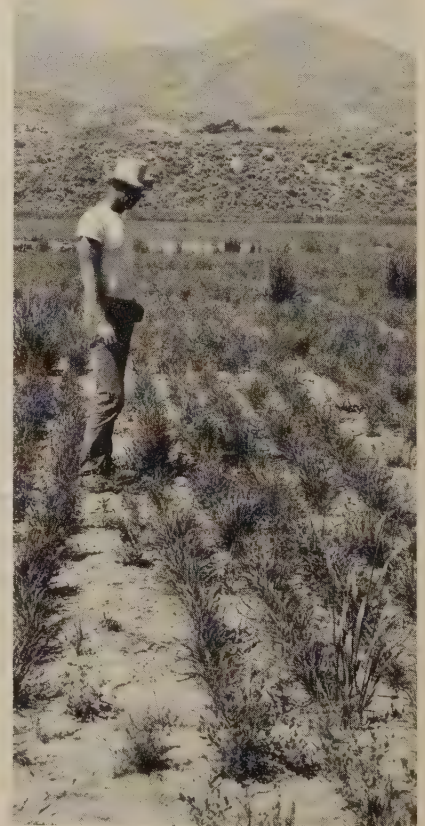
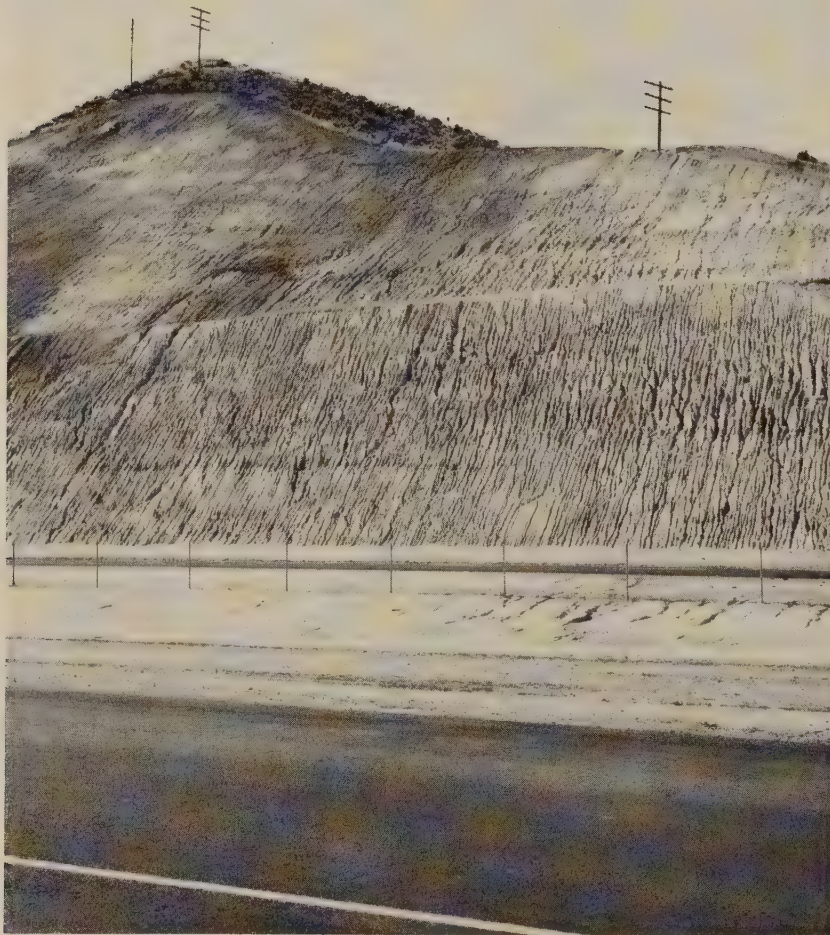
State resource conservationist, SCS
Reno, Nevada

area and which conservation practices will control erosion, stop drifting sand, or solve other conservation problems.

Along a beautiful stretch of Nevada highway, for example, your driving may be made more pleasurable and much safer by 'Sodar' streambank wheatgrass, developed by plant materials specialists of the Soil Conservation Service.

This strain of wheatgrass is low-growing, making maintenance less expensive. It doesn't burn readily. Deer pass it up, making wildlife less of a driving hazard. And, it's tops as an erosion-control plant.

Grass strains and varieties of other plants chosen for conservation work in Nevada are largely the product of cooperative trials by SCS and the state experiment station at Knoll Creek. A series of tests eliminates all but the most promising plants. Survivors of the final field tests are eventually released for commercial production.



In addition to plant materials specialists, other SCS people contribute to the state's conservation program. Soil scientists help when complex soil problems are involved. SCS biologists give

advice on the choice of shrubs and trees to sustain or, in the case of the highways, to repel wildlife. And, SCS engineers may help in the planning work of structural measures to stabilize roadbanks.

But federal, state, and local cooperation doesn't stop at the roadside. The Department of Fish and Game also calls upon SCS to help test plants for their value as wildlife food and cover in a state where high summer temperatures and salty soils complicate the problem.

For crystal-clear Lake Tahoe, recently threatened by an excessive rate of sediment flow with accompanying nutrients, the search is on for plants that will stabilize soils at high elevations and withstand the dry summers. The Pleasanton Plant Materials Cen-

ter in California is assisting the Tahoe-Verdi Soil Conservation District in this search for needed plant varieties and effective planting methods. Last year the district and its cooperators contributed \$4,000 to this project.

At the Navy Auxiliary Air Station at Fallon, a special erosion problem has been tackled. Dry desert alkali soils, drifting and blowing as jet aircraft take off and land, are a hazard. Officials asked the Lahontan Soil Conservation District for help. SCS field test plantings have produced several low-growing, drought-tolerant grasses that could solve this problem.

On land, water, and in the air, Nevada officials, soil conservation districts, and SCS are working together to produce a cleaner, greener state. ♦

This highway cut (left) is typical of rapidly eroding roadside embankments needing soil-holding cover.

Siberian wheatgrass (center), tested at Nevada's Knoll Creek State Experiment Station, appears suited to conservation work in the state's high, dry climate. SCS scientists say that finding erosion-controlling plants for use around beautiful Lake Tahoe (right) is one of their most urgent jobs. Thousands of tons of sediment pour into the lake each year from subdivisions.



Emo
a new



Emerald Sea-- shore juniper

by H. W. Everett

Manager,
National Plant Materials Center,
SCS, Beltsville, Maryland



Juniperus conferta, the shore juniper of Japan, occurs from the tropical beaches of Okinawa to the coast of Hokkaido and the Sakhalin Islands. It was from this wild stand at Ashiarai that cuttings were collected in 1967.

If you have ever been in Washington, D.C., in the spring you will agree that Japanese cherry trees with their beautiful blossoms are a hard act to follow. Nevertheless, another Japanese immigrant, 'Emerald Sea,' a new cultivar of shore juniper (*Juniperus conferta* Parl.), shows promise of proving popular as a landscape planting and as an erosion-control planting on sand dunes.

Emerald Sea was released by the Plant Sciences Division of the Soil Conservation Service and the Plant Science Research Division of the Agricultural Research Service in May 1972. It was collected as cuttings in 1967 from low coastal sand dunes along Ashiarai, Ibaraki Prefecture, Honshu, Japan, where it is the predominant plant. The collection was made at the specific request of W. W. Steiner, SCS's chief plant materials specialist.

Emerald Sea is a coniferous evergreen suitable for landscape use and shore plantings. Its mat-forming habit and salt-spray tolerance should prove valuable in stabilizing coastal and inland dunes.

The stems of Emerald Sea grow almost prostrate as compared to most accessions of shore juniper, which have somewhat ascending stems. Emerald Sea shows less tendency to produce hummocks of foliage as the ground becomes covered than do most other prostrate junipers.

The leaves are like needles, borne in evenly spaced whorls of three, from 1 to 1.5 cm. long. Each leaf bears a single gray-green stripe on the upper surface. Emerald green in summer and fall, the foliage turns somewhat yellowish green in winter.

Emerald Sea has proved winterhardy in Maryland and New Jersey and should prove hardy farther north. It is under test in New Jersey for dune stabilization and in Maryland for ornamental

groundcover use. Michigan, Kentucky, North Carolina, and Rhode Island are also evaluating the conservation potential of this cultivar.

Emerald Sea grows well in full sun and thrives on sandy soils. It roots easily, is long-lived and salt tolerant, and never grows more than a foot high.

Limited numbers of rooted cuttings are available for distribution to plant materials centers, experiment stations, arboreta, and qualified nurserymen. Requests for propagation material should be sent in writing to the U.S. Plant Introduction Station, Glenn Dale, Maryland 20769, or to the National Plant Materials Center, Soil Conservation Service, Bldg. 509, A.R.C., Beltsville, Maryland 20705. ♦

Chemical tolerant switchgrass to help control water pollution

If herbicides from your cropland spill over into your pastures or grassed waterways, it may be wise to have some switchgrass around, says Billie Rountree, SCS plant materials specialist for Iowa, Illinois, and Missouri. "Recent trials at the SCS Plant Materials Center at Elsberry, Missouri, indicate switchgrass is tolerant to the use of certain herbicides," Rountree said.

Agronomists from the states served by the center who find herbicides hard on waterways have been looking for tolerant grasses. Good grass waterways and grass strips not only provide a safe water course for disposal of runoff water but filter out some of the sediment being carried in the water.

In 1969, 'Garrison' creeping foxtail, 'Elsberry' smooth brome-grass, 'Ioreed' reed canarygrass, and 'Blackwell' switchgrass were seeded in individual plots to evaluate their respective tolerance to some commonly used herbicides. Chemicals used were Amiben, Atrazine, Bladex, Dac-

by Donald C. Smith

Soil conservationist, SCS
Elsberry, Missouri

thal, Propazine, Ramrod, and Simazine. Chemicals were applied at 1-, 2-, and 4-pound rates per acre. Application dates were May 13 and June 18. The results may surprise you.

Switchgrass, a warm-season grass, did not appear to be adversely affected by any of these chemicals. The cool-season grasses showed varying degrees of damage depending upon the chemical, amount applied, and time of application. Where the triazine chemicals were used at heavy rates, cool-season grass stands were cut 50 percent or more.

"Establishment of warm-season grasses has been a problem," said Rountree. Farmers have been hesitant to seed warm-season grasses because it takes 2 or more years to establish an adequate stand. To evaluate the use of herbicides in the establish-

ment of warm-season grasses, tests at the center were expanded during the spring of 1971. Switchgrass, big bluestem, and indian-grass were seeded May 4, 1971, and the same chemicals and rates applied pre-emergence and post-emergence.

At the end of the growing season the best stands of switchgrass were observed where the triazine chemicals were applied as a post-emergence treatment.

Since the big bluestem and indiangrass stands were sparse due to low seed viability, no conclusion was made as to their resistance.

Final returns will not be in for several years. But a switch to switchgrass on waterways where herbicide runoff is a possibility may be a good idea. ♦

The switchgrass was seeded on May 4, 1971. Two pounds of Propazine were applied on May 13, 1971. On December 16, 1971, the stand of grass was rated 100 percent tolerant to the chemical.



Nature's own pollution control device

by Erling T. Jacobson

Manager,
SCS Plant Materials Center
Manhattan, Kansas

Plants are nature's most effective pollution control device. They're an excellent—and inexpensive—air conditioner. And, they're beautiful.

But plants vary a great deal in their ability to control soil erosion and to reduce pollution. The Soil Conservation Service continues to search for the best possible plants for these uses. Here in Kansas, this often means using some variety of grass.

Versatile vegetation

What can grass do for the environment? Well, an acre of grass in good condition releases about 2,400 gallons of water on a windy summer day through evaporation and transpiration—which equals the cooling effect of a 70-ton air conditioner.

Animals, both domestic livestock and many forms of wildlife, forage on grass. And further, grasses are often ideal for erosion control, recreational uses (golf courses, football fields, parks), and as borders, desilters, or living screens to improve and beautify many areas.

In the SCS Plant Materials Center at Manhattan, Kansas, we maintain foundation seed stocks of eight improved varieties of grass that have been developed cooperatively with the Kansas State University Agricultural Experiment Station and the Agricultural Research Service. The center has 30 accessions in initial seed increase that are currently being tested cooperatively with

other state and federal agencies in the central Great Plains area.

The center also has more than 800 individual collections of grasses and legumes, 200 collections of forbs, and more than 350 different species, strains, selections, or origins of woody plants being observed and evaluated for a specific conservation use or as a solution to an environmental problem in either rural or urbanizing areas.

For example

Let's take a look at 'Bend' sand lovegrass, a recent experiment station-SCS release that was developed to help control wind erosion on sandy soils in Kansas.

Native sand lovegrass is a bunchgrass that is one of the preferred grass species for livestock. It decreases rapidly under continuous grazing but responds well to management in planned grazing systems.

The improved Bend variety is similar in general appearance—tall and leafy—to the local native strains in south central Kansas. In tests it has compared favorably with other strains in production of dry matter. Bend, a perennial, is uniform in maturity, is a good seed producer, establishes well, and, at the Manhattan Plant Materials Center, is relatively free of disease.

Bend sand lovegrass is recommended for use in Kansas as a component in grass seeding mixtures on sandy soils or as a surface stabilizing grass on more favorable sites in planned grazing systems. Because of its bright green color it has a good potential for use as an attractive

low-maintenance erosion control grass on sandy soils.

Another grass recently selected and released by SCS's Manhattan Center is 'Barton' western wheatgrass—a superior, cool season native grass variety. Progress is also being made on an improved buffalograss for Kansas; on little bluestem and blue grama for western Kansas and portions of Nebraska; on prairie sandreed for the sandy lands of Nebraska; and on big bluestem for Oklahoma.

When it comes to grass and other kinds of plants, Nature produces miracles. But a little help from man is sometimes needed to get the biggest, best, and most appropriate grasses growing in the right places. ♦

The author examines a stand of 'Kanlow' switchgrass at the Manhattan Plant Materials Center.



take it off, take it off-- grass seed stripper under scrutiny

A grass seed stripper being tested at the Soil Conservation Service's Plant Materials Center at Knox City, Texas, could mean a major breakthrough for harvesting fluffy grass seed.

In fact, the weird-looking machine eventually may help put seed of several hard-to-harvest grasses on the market at reasonable prices.

Most grass seed is now harvested with a combine. On the Texas High Plains, for example, more than a million pounds of grass seed from 25 different varieties are grown under irrigation each year. This \$2 million crop is harvested with conventional combines.

But combining is impractical for certain light, fluffy seed. As a result, some highly desirable grasses are not available on the market.

A second problem is that most grasses ripen unevenly, shattering as they mature. At any given time during seed maturity, some are ripe, some have already shattered, and some are green. When a combine is used on such a crop, most of the green seed is ruined.

So what is needed is a machine that will harvest ripe, cottony seed while leaving green seed on the stalk to mature for later harvesting.

The two-row air transport stripper was devised by SCS plant materials specialists to perform this task. The machine was built by the Agricultural Research Service for trial and use at the Plant Materials Center at

by Dale D. Allen

Public information officer, SCS
Temple, Texas

Knox City. Although modifications and refinements were made, the machine has proved to be soundly designed.

The harvester has two sets of 5-foot long brushes for each row. As the brushes pass over the seed head at about a 45 degree angle, they turn upward and outward, brushing the seed into pans. The seeds are then picked up by suction and blown back into a sacking device. The fan that provides the suction and blowing power is offset so that the seeds never touch it; this keeps the fan from damaging the seed.

The stripper-air transport idea was developed from a similar concept built into a cotton stripper in the 1950's by the Dearborn Company. SCS plant materials specialists and ARS engineers teamed up to build a grass seed stripper with parts taken from two of the old Dearborn cotton strippers.

The cotton strippers were mounted on a used Case 840 swather body. At Knox City, the swather's engine proved to be too small to handle the harvester, so a larger engine has been substituted.

SCS hopes a major equipment company will build strippers, using the air transport principle, for sale to the public. Inquiries at Knox City indicate such a machine would be in strong demand by seed producers, both in the United States and abroad.

An example of how the stripper could help solve a specific conservation problem is two-flowered trichloris. This grass appears to have excellent possibilities for use on thousands of acres of bare, saline soils in arid sections of the Southwest.

But seed for the plant cannot be bought through commercial sources; it is so hard to harvest that no seed producer will grow it.

The stripper may prove to be the answer to harvesting two-flowered trichloris.

The machine is also doing an excellent job on such hard-to-harvest grasses as Arizona cottontop, fourflowered trichloris, whiplash pappus, silky bluestem, and cane bluestem. It also appears useful for harvesting indiagrass, buffelgrass, sideoats grama, Caucasian bluestem, 'King Ranch' bluestem, 'Kleberg' bluestem, kleingrass, and similar grasses.

Another advantage of the stripper is that the seeds are cleaner than combine-run seed. Arizona cottontop seed, for example, comes out of the stripper ready to plant; when harvested with a combine, it takes at least one seed cleaning operation to get it ready to plant. The same is true of certain other grasses. Cane bluestem has as much as 80 percent clean seed when stripped; when combined, it runs as low as 10 percent.

Eliminating the seed cleaning operation would cut out a big expense for the seed producer who has to pass his costs on to the buyer. ♦

It's no beauty contest winner, but
this experimental grass seed
stripper does a nifty, thrifty job.



the dwarf



goes *Hawaiian*

by Vincent J. Price

Information Division, SCS
Washington, D.C.

A South African dwarf grass has made it big in Hawaii.

The grass, a dwarf strain of pangolagrass (*Digitaria decumbens*), originally came from the Eastern Transvaal. It was collected in South Africa in 1964 by Dr. A. J. Oakes of the U.S. Department of Agriculture's Agricultural Research Service.

Dr. Oakes was in South Africa looking for plants for erosion control and improved pasture.

He collected 90 strains of pangolagrass, commonly known as wooly finger grass in South Africa, for testing in Florida, Puerto Rico, and Hawaii.

In Hawaii, the plants were tested at SCS's Plant Materials Center on Maui. Plant materials specialists there became increasingly interested in the odd fellow, the dwarf strain.

"Rapid growth from cuttings and the formation of a dense mat of stems and fine leaves under a wide range of soil conditions are two of the best qualities of this grass," reported DeReath Palmer, an SCS plant materials specialist. "Also, it is resistant to drought, and its low height generally eliminates the need for mowing."

The dwarf strain is sterile. It is grown from stolons (runners)

and takes root rapidly from nodes along the stolons. The trailing effect of the stolons (trailing into depressed areas and small gullies) tends to put the grass where it is needed most, and the planted stolons remain viable for several weeks with little or no rain.

In July 1971, the dwarf had its first major roadside test. An eroding slope above the Pali Highway on Oahu was cut back to a 45 degree bank and planted to the light-green grass. The State Highway Division conducted the planting, working with the Windward Oahu Soil and Water Conservation District.

The dwarf provided a dense, attractive cover on the 60,000-square-foot site within 60 days. Within a year, the plant was in wide use throughout the island of Oahu, protecting and beautifying scarred and eroded areas.

The dwarf is not now limited to Oahu. It is being used in other parts of Hawaii and in Guam.

The U.S. Navy uses the dwarf in Guam to cover ammunition bunkers. According to the Navy Department's natural resource management specialist, Gerald Swedborg, "Demonstrations have shown that the dwarf . . . provides excellent cover and signifi-



The dwarf (a dwarf strain of pangolagrass) along Pali Highway.

cantly reduces annual maintenance costs.

"We don't even have a mowing problem where we use the dwarf because the carabao (water buffalo) . . . continuously graze on the grass, except when fenced out to prevent overgrazing."

As a result of Soil Conservation Service efforts, the contract specifications for covering the Navy's ammunition bunkers currently under construction on Guam have been changed to require the use of this dwarf type of *D. decumbens*.

"In addition," Swedborg reported, "Our commanding officer (U.S. Naval Magazine, Guam) has initiated a program for covering other erosion scars in the magazine area with the dwarf."

The dwarf grass has moved fast from introduction to common use. As the plant continues to thrive, environmental benefits will increase for the islands of the Pacific Basin. ♦

The dwarf on Guam.



Plants

by Wendell G. Hassell

Manager,
SCS Plant Materials Center
Tucson, Arizona

A plant can have it tough in Arizona, where it may not rain for 6 months at a time, where the temperature may soar to above 100 degrees for more than 100 days, and where the soil may be too rocky or sandy for most plants to survive.

These are some of the problems that the Tucson Plant Materials Center (PMC) has in testing plant varieties that will survive and prosper in the Southwestern United States.

One of the biggest current challenges to the center is testing plants that can be established on the slopes of freeway overpasses.

In addition to the problems of heat, poor soil, and limited water supplies, most of Arizona's overpasses are in steep areas where wind erosion is a problem and where large equipment cannot be used safely.

This makes establishment of vegetation on slopes a difficult job, oftentimes with only a 50-50 chance of survival for even the hardiest plants.

For example, experimental plantings of various lovegrasses and other plants were made on the Bowie Interchange Freeway overpass in southeastern Arizona. There was no available water for a sprinkler system, so the only chance was to prepare the seedbeds and plant before the summer rains.

The compacted soil on the Bowie slopes had to be loosened before seeding, which was done

have it rough in Arizona

by hand because of the steepness of the slope. Boer lovegrass straw was applied as a mulch at the rate of 2 tons per acre. The mulch will hold moisture and help control soil erosion. To prevent the mulch from blowing away, it was treated with asphalt emulsion or tuckered into the soil with a special mulch tiller.

Once planted and mulched, the seeds need an inch of rain to germinate, followed by rain in the next 15 to 18 days.

When all of these preparations and hurdles are passed, the grasses and other plants have a chance to survive. But final results will not be known for several years.

It takes a long time for a plant variety to earn the center's seal of approval for a specific conservation job. Some plants are tested 12 to 16 years before they "graduate." Last year, out of almost a hundred varieties tested, only two were selected for advanced study.

The system for testing plants at the PMC is as follows:

Plant materials are collected and segregated into use groups. They are then planted and evaluated in initial testing trials.

A second testing stage takes place on typical areas in the field, using promising plants selected from the earlier PMC tests.

Seed stocks of the outstanding selections are produced from the secondary stages and distributed for final testing in field plantings on cooperating farms and ranches.

When improved species or strains are considered ready for use, they are named and released cooperatively with experiment

stations and other agencies. The center then maintains breeder and foundation quality seed and furnishes foundation seed through crop improvement associations and soil conservation districts to farmers who in turn produce and sell certified seed.

This kind of testing program screens out unadaptable or undesirable plants and provides varieties that are improvements over those now in use.

With time and patience, the Tucson PMC, in cooperation with the Arizona State Highway Department, expects to be able to produce plants that can meet the demands of conservationists who are working for safer and more scenic highways. ♦

Arizona wants protected slopes, not rill erosion.



Plants for California highways

Everybody is concerned these days about stopping pollution. The California Division of Highways is doing something about it. The division has entered into a cooperative agreement with the Soil Conservation Service to develop conservation plants for use on highway banks that will reduce erosion, rehabilitate disturbed areas, and be inexpensive to maintain.

The cooperative venture got underway when the Division of Highways agreed to provide funds to the Soil Conservation Service to conduct a search for new plants at the SCS Pleasanton Plant Materials Center in California.

What kinds of plants are needed? Landscape architect Kenneth Buchanan of the Division of Highways says the ideal plants are short, protect disturbed soils, are easy to establish, do not create a fire hazard or attract wildlife, are long-lived, and, of course, need little maintenance. To find such plants is a challenge. Fortunately, work at the plant materials center in the past several years has resulted in some excellent leads.

Barley and annual ryegrass have been widely used to help

by George Edmunson

Soil conservationist, SCS
Pleasanton, California

stabilize highway banks in the Mediterranean-type climate areas of California. Both, however, produce a lot of vegetative material which becomes dry in the summer and sometimes creates a fire hazard.

A very promising plant is 'Blando' bromegrass, a short grass developed at Pleasanton for erosion control and forage. It already is in limited use along some highways. Besides being less of a fire hazard, Blando has a softer appearance and is more pleasing to the traveler than the coarser stemmed barley and ryegrass. Blando also permits the establishment of wild flowers with it, such as California poppy and annual lupine.

In the Sierra Nevada region, perennial grasses are well adapted to roadside use. 'Sodar' stream-bank, 'Tegmar' intermediate, and 'Topar' pubescent wheatgrasses

'Blando' bromegrass (foreground) provides a short cover on difficult sites, blends well into the natural landscape, and reseeds each year.

and 'Durar' hard fescue look promising.

Shrubs often are useful in helping to return constructed highway slopes to permanent and natural-looking vegetative cover. Plants less than 5 feet tall that spread widely are ideal for this purpose. To keep maintenance costs down, shrubs that do not require summer watering should be selected.

Many native shrubs, as well as plants brought in from other countries, have these characteristics, but little is known about how to propagate or establish them. This is one of the major studies to be conducted at Pleasanton and on highway bank test sites.

The most promising shrubs for lower elevations in California include species of manzanita, ceanothus, buckwheat, sage, salt-bush, rockrose, and coyote bush. Native plants found in higher elevations, which may be useful, are squaw carpet, bitterbrush, big sagebrush, rubber rabbitbrush, and several species of manzanita. One exotic sagebrush, *Artemisia caucasia*, is already promising as a groundcover.

Hilly and mountainous areas along the coast and in the Sierra Nevada range are receiving the greatest emphasis in the plant-testing program. To date, 938 test plots of grasses, legumes, and shrubs have been established in four principal testing areas. One area is near San Francisco, another in the Sierra Nevada foothills, one at Alturas, and the fourth in the Tahoe Basin. The tests will be continued for several years, with frequent reviews to determine which plants or combination of plants perform the erosion-control function best and require the least maintenance. ♦



Review

Wilderness Canoeing. BY JOHN W. MALO. 1971. *The McMillan Company*, 866 Third Avenue, New York, N.Y. 10022. 196 pp., illus. \$6.95.

This 196-page book is a well-organized, well-written, and complete guide to wilderness canoeing. Its range of topics includes advance planning, food and its preparation, navigating the trails and white water, common sense and discipline on the trail, and sources of information and maps on wilderness locales.

The experienced canoeist will find that the book can add to his accumulated knowledge. The novice will yearn to try what he has learned on his next trip. Malo speaks with authority and has complemented his narrative with numerous pictures, "how to" sketches, and charts.—HANS G. UHLIG, *recreation specialist, SCS, Upper Darby, Pennsylvania*.

Inorganic Chemical Pollution of Freshwater. ARTHUR D. LITTLE, INC., FOR THE ENVIRONMENTAL PROTECTION AGENCY. 1971. 280 pp., illus. \$2.25. A survey of the literature dealing with inorganic chemical compounds was conducted to obtain and reference data relevant to the establishment of water quality criteria. More than 5,000 publications were reviewed. While nearly 300 inorganic species may exist in freshwater, only 87 were identified in the literature.

The Effects of Artificial Aeration on Lake Ecology. BY ARLO WADE FAST. 1971. *U.S. Environmental Protection Agency, Water Pollution Control Research Series*. 470 pp., illus. \$4.25. This report gives the results of a study of two northern Michigan lakes—a eutrophic lake and an oligotrophic lake—artificially aerated using compressed air. The lakes were studied in 1969 under normal conditions and in 1970 under test conditions.

Flushing of Small Shallow Lakes. BY CLAUD C. LOMAX AND JOHN F.

ORSBORN. 1971. *U.S. Environmental Protection Agency, Water Pollution Control Research Series*. 39 pp., illus. \$0.50. Report of results of the investigation to restore quality to

polluted lakes by inflows of clean water with simultaneous outflow of polluted water. Elliptical basins were used in the laboratory to simulate shallow lakes.

Meetings

November

- 12-15 National Association of State Universities and Land Grant Colleges, Washington, D.C.
- 12-16 National Water Resources Association, Salt Lake City, Utah
- 12-17 National Association of State Departments of Agriculture, St. Croix, Virgin Islands
- 13-15 Geological Society of America, Minneapolis, Minn.
- 13-21 National Grange, Hartford, Conn.
- 16-20 Adult Education Association of the USA, Minneapolis, Minn.
- 26-30 National League of Cities, Indianapolis, Ind.
- 27-29 National Land Use Policy Conference sponsored by the Soil Conservation Society of America, Des Moines, Iowa
- 27-Dec. 1 American Association of State Highway Officials, Phoenix, Ariz.
- 29-Dec. 1 National Conference of State and Federal Water Officials, Austin, Tex.

December

- 3-7 American Farm Bureau Federation, Los Angeles, Calif.
- 5-8 Western Forestry and Conservation Basin, Spokane, Wash.
- 6-7 National Association of Manufacturers, New York, N.Y.
- 11-15 American Society of Agricultural Engineers, Chicago, Ill.
- 13-15 Midwest Wildlife Conference, Des Moines, Iowa
- 26-31 The American Nature Study Society, Washington, D.C.
- 26-31 American Association for the Advancement of Science, Washington, D.C.

January 1973

- 7-11 National Association of Home Builders, Houston, Tex.
- 10-11 National Council of Farmer Cooperatives, Orlando, Fla.
- 22-25 National Woolgrowers Association, Washington, D.C.
- 25-27 American National Cattlemen's Association, San Antonio, Tex.
- 26 National Highway Research Board, Washington, D.C.
- 28-Feb. 2 American Society of Civil Engineers, Water Resources Conference, Washington, D.C.
- 31-Feb. 3 Catfish Farmers of America, New Orleans, La.

February

- 3-5 National Navigation Conference of Water Resources Congress, New Orleans, La.
- 4-9 Society for Range Management, Boise, Idaho
- 5 American Geographical Society, New York, N.Y.
- 6-8 National Dairy Housing Conference, East Lansing, Mich.
- 11-15 National Association of Conservation Districts, Las Vegas, Nev.
- 18-21 Sprinkler Irrigation, Technical Conference, Dallas, Tex.



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From the Administrator:

The search goes on

The Soil Conservation Service has introduced a bushel of new ideas for plants and their uses in conservation work.

Are we hiding our light under the same container?

SCS plant materials centers—now 20 of them—quietly perform vital work in the nation's quest for a better environment. That work deserves to be appreciated and applied more than it is.

The centers have selected, tested, increased, and released for commercial production more than 100 new conservation plant varieties that are in large-scale use—13 last year alone. Many more are on the way. This summer, for the first time in more than a decade, an SCS plant materials specialist explored Turkey and Iran for 3 months with an Agricultural Research Service scientist. We anticipate some valuable new plant varieties from that trip.

The centers work toward a wide range of conservation needs. Once oriented mainly to producing forage plants and cover crops to protect farm or ranch land and vegetation to stabilize waterways, they now give high priority to plants that:

- Reduce sediment pollution by stabilizing critical sources such as surface mined land, highway banks, urban and industrial sites.

- Protect and beautify recreation areas.

- Help treat solid and liquid wastes from farm, urban, and industrial sources, and help stabilize the disposal areas.

- Provide fire-resistant cover for dry brushlands that are a threat to life and property while burning and a source of hazardous mud slides later.

- Stabilize coastal and inland sand dunes.

- Protect streambanks and pond or lake

waterlines from erosion by wave action or stormflows.

- Make better windbreaks to guard against property damage from airborne soil particles.

- Provide wildlife food and cover.

- Produce meatier, healthier animals on pasture and range and protect the land better.

Several of the centers also are working to protect and increase plants that are on the list of rare and endangered species. We can be of greater service in this area.

SCS is getting increasing help in its plant materials work from conservation districts. Their cooperators aid in field planting trials away from the centers. Their boards of supervisors aid in suggesting priorities for plant needs, as do the research committees of their state associations. SCS also is aided by state and federal experiment stations, departments of fish and game, highway commissions, and others.

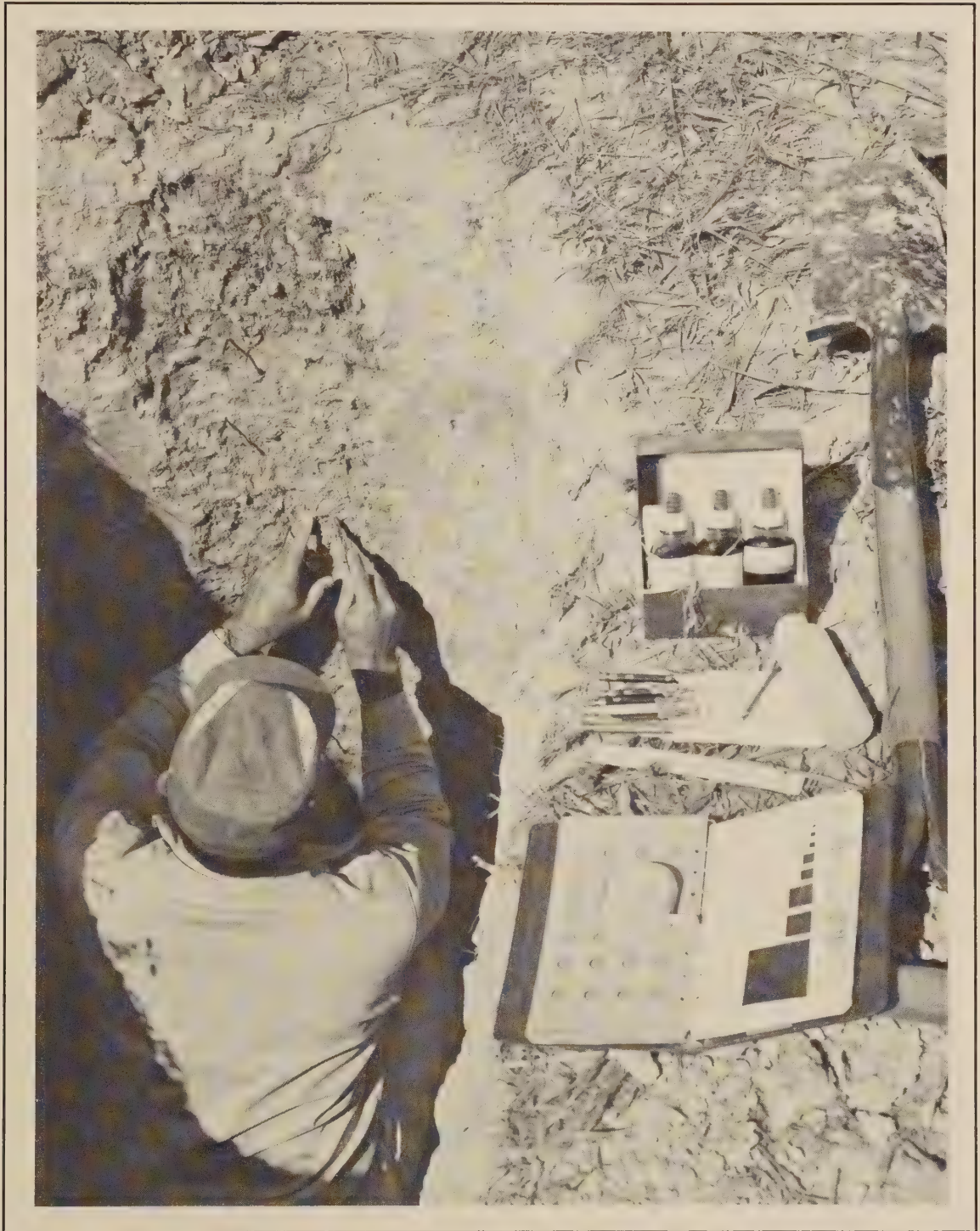
Within SCS, cooperation among the many technical disciplines is helpful in setting needs, collecting and evaluating materials, and encouraging the use of new plants after release. Advisory committees of SCS state conservationists give excellent guidance.

We have a continuing challenge to help SCS plant materials centers do the most effective job and to let people know about the many values of the centers and their products.

Kenneth E. Grant

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / December 1972



Soil surveys and soil scientists are saluted this month in SOIL CONSERVATION. There is almost a desperate need to determine the best purposes to which land should be dedicated. The soil survey offers the opportunity to answer that need.

Computers may be the best way for soil scientists to keep up with the demand for soil data. Lindo Bartelli discusses what is being done in that field. A three-author article explains why Nevada needs and plans to use reconnaissance soil surveys. What's good for Nevada may be good for other parts of the country.

George McGrath has put together a neat article about the "debut" of the soil survey of Greenbrier County, West Virginia. A true success story—and all it took was a lot of work on the part of some dedicated West Virginians.

COVER: A soil scientist at work.

- 91 From the Administrator
While the iron is hot
- 92 Courting the computer
by Lindo J. Bartelli
- 94 Presenting . . . The soil survey
by George E. McGrath, Jr.
- 96 Living high in Appalachia
by Robert A. Speich and John P. Carr
- 98 The ground's the limit
by Morris S. Gillespie
- 100 Reconnaissance soil surveys aid planning in Nevada
by F. F. Peterson, E. A. Naphan, and B. J. Vasey
- 104 Buena Vista is looking better
by A. Bertram Hawkins
- 105 Terraces in town
by Cal Cox
- 106 Dream house becomes haunted house
by Donald L. Lucas
- 107 Conservation in action
- 109 Review
- 111 Meetings
- 112 Recon

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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While the iron is hot

There always has been a pair of eyes watching from the edge of the field as an SCS soil scientist studies the makeup and condition of the land.

An inquisitive deer . . . an discontented bull . . . the neighbor's dog . . . a curious child . . . or a landowner anxious to use soil information in planning the use and treatment of his land.

Increasingly, the stare at the edge of the field belongs to a town, county, or state planning official. The demand for soil facts and interpretations has grown apace with America's interest in making land use patterns more pleasing for people and protective of their environment.

Communities every day are making decisions in which soil survey information should be considered along with other inputs. Too often they cannot wait until the field study and lab testing and writing and checking and printing are done. Some have had to decide without the soil survey. Others have sought to speed up the soil survey process or to make use of preliminary data . . . almost literally waiting at the edge of the field. In hundreds of counties, local or state governments have paid part of the cost of the survey to speed its completion.

SCS and the other agencies in the National Cooperative Soil Survey have been working to speed the process too, all the way from data gathering to final publication. We've streamlined the manuscript review so well that last year SCS sent 80 surveys to the printer, the most ever in one year and twice the number sent in 1969.

We've worked with local and state governments to provide interim publications that can shorten the waiting game by a year or more. These advance reports—often simply copies of the soil scientists' field sheets and a page or two of interpretive statements—have proved extremely helpful. Training sessions on their use have assured fullest use of the information.

We've also looked for improved techniques and procedures to prepare soil surveys faster,

more accurately, and less expensively. For example, contracting out some phases of map compilation and finishing might give soil scientists more time for field surveys.

The use of infrared and color photography from aircraft and from the Earth Resources Technology Satellite now in orbit may provide some data useful in marking soil boundaries, in spotting land use patterns and changes, and in noting vegetative conditions. SCS is cooperating with researchers in other agencies and at state universities to test the usefulness of these programs in several SCS activities.

SCS has developed a standardized form for recording soil data and interpretations in a way that the information can be stored in a computer data bank. This makes possible computer-produced technical guides; soil interpretive tables; and summaries of soil statistics for states, regions, and the nation. Combined with an automated cartographic system, this new procedure will lead to rapid preparation of soil survey and soil interpretive maps for publication.

While working to produce better soil survey information faster, SCS employees and conservation district supervisors must increase their efforts to work with people who can use soil information and to help them understand its value.

Finally, SCS recognizes that the kinds of soil we have been studying, mapping, and interpreting are ecosystems. We must find more and better ways to help guide thinking in this vastly complex area and to help people develop programs that can preserve and enhance the quality of the environment, the natural resource base, and family standards of living.

The time is now.

Kenneth E. Grant

Courting the computer

Automation in the soil survey program

by Lindo J. Bartelli

Principal soil correlator

South Regional Technical Service Center, SCS
Fort Worth, Texas

The computer is the speediest and most efficient worker that man has ever been able to hire to do a wide variety of jobs—especially those of great magnitude and complexity. Is it just what is needed in the soil survey program?

The use of automatic data processing as an aid in speeding up the preparation of soil survey manuscripts is being tested at the South Regional Technical Service Center, Fort Worth, Texas. Present indications are that computer procedures will ease the task of the soil scientist, who must consider, sort, and record many facts about the area he has surveyed. A computer presumably will allow him to complete a manuscript in a much shorter time and will greatly reduce the amount of clerical work now required to type the text, tables, and captions.

The pilot study involves techniques for preparing soil survey manuscripts in a new way. The Soil Correlation Unit houses two IBM 2741 Communications Terminals which have the capacity to transmit soil survey data by wire to a large IBM 360, model 50, computer at the University of Texas, Dallas.

Edited basic text and soil interpretation data are typed on the IBM 2741 machines, which transmit the material to the IBM 360 computer for storage on an attached memory disc. The information can be recalled by printing through either the Fort Worth facilities or those at Dallas.

This new system introduces the technique of modular writing. Models of selected chapters of soil survey manuscripts, written by a staff member and reviewed and edited, are stored in the computer. Copies of these models are recalled and given to a soil survey party chief when he is ready to prepare a manuscript. He changes the models so that they give complete and accurate de-

scriptive and interpretive data for his survey area. The operator in the Soil Correlation Unit enters the changes indicated by the author, and these become a part of the final manuscript.

The machines are capable also of producing tables that list soil interpretations for the various mapping units in the manuscript.

After all inputs are made, the Dallas computer provides a copy of the manuscript on its high-speed printer. This manuscript is sent to Washington, D. C., for final review and editing prior to publication.

In the statistical laboratory at Iowa State University, in Ames, procedures are being developed for storing interpretation data for soil series from throughout the nation. Plans are being made to develop retrieval procedures for producing not only interpretation sheets for individual series, including important phases, but also numerous other outputs such as tables for soil surveys, technical guides, and special reports.

The procedures at Ames also will provide for various analysis of interpretive and inventory data and the printing of resultant summaries as needed to depict the nation's land use potential.

Plans are also underway to automate map compilation. An advanced mapping system is being designed to produce press negatives of soil survey atlas sheets, ready for the printer.

A byproduct of this map compilation procedure is the ability to produce data in map or tabular form. The system as presently planned is expected to produce base maps and soil interpretation maps for resource planning and development.

The SCS Cartographic Unit in Hyattsville, Maryland, has digitizing and automatic drafting equipment that is being used for both map production and developmental work. The Advanced Mapping System will consist of



digital scanners, coordinate digitizers, high-speed printer/plotters, an interactive graphic display system for editing, and a small computer to act as a central controller that could be connected on-line to a large-scale computer, all in conjunction with our present equipment.

The present computer system with one terminal at the Fort Worth RTSC can produce about 35 soil survey manuscripts, and several special reports, per year. It is estimated that this system may reduce the man-hours required for field preparation of manuscripts by as much as 50 percent. ♦

Connie Miller (standing) and Vicki High of the Soil Correlation Unit in Fort Worth use an IBM 2741 Communications Terminal to transmit soil survey data to an IBM 360, model 50, computer at the University of Texas in Dallas.

Presenting... The soil survey

by George E. McGrath, Jr.
Information Division, SCS
Washington, D.C.

Last summer in southeastern West Virginia, the Greenbrier County Soil Survey was released to the public.

Greenbrier County is the second largest county in the Mountain State. It covers 656,640 acres. It took many years to survey the county's soils and map each acre—but it was worth it.

Soil conservation district officials, SCS people in the state,

some planners, and a few others knew the value of the finished soil survey. But how do you prepare the public—including landowners and developers—to accept it? How do you get people to realize that they have one of the most useful tools they could possibly use?

In Greenbrier County, a committee was formed well in advance of the public unveiling of

the soils report scheduled for July 31. The committee developed and carried out a "plan of action" to explain the need for the report and the many uses to which it could be put. The committee's chairman was Albert E. Beaty, SCS district conservationist at Lewisburg. Committee members were David E. McKinney, SCS soil scientist; James M. Van Metre, county extension agent; and David E. Tuckwiller, supervisor of the Greenbrier Valley Soil Conservation District.

Al Beaty and Jim Thorn, the SCS information specialist at Morgantown, decided that a series of articles on the soil survey in local newspapers could result in widespread publicity. They approached the editor of the *West Virginia Daily News* at Lewisburg about the project, and he agreed to give first-page coverage to the soil survey for 13 consecutive weekdays ending on July 31.

The daily articles dealt with a variety of topics: why engineers and developers need a modern soil survey; step-by-step explanation of how soils are mapped; se-



Leonard S. Newman studies the texture of the soil . . . and Woodrow W. Beverage checks soil acidity . . .

lecting the right soil for the right use—timber production, agriculture, recreation, wildlife; and the wide variety of soils and of land uses in Greenbrier County.

James S. Bennett, the SCS state conservationist, led off with an article describing a soil survey as an “X-ray of the soil.” He stated, “Properly interpreted, this (soil survey) information enables us to ‘get ahead of the bulldozer.’”

Another article explained that in West Virginia soil surveys are carried out cooperatively by SCS and the West Virginia University Agricultural Experiment Station and that the educational program is a joint responsibility of SCS and the West Virginia University Appalachian Center.

The writers of the articles, in addition to Bennett, McKinney, Van Metre, and Thorn, were Gus R. Douglass, West Virginia agriculture commissioner; James L. Dove, conservation engineer; Richard H. Andersen, assistant state soil scientist; John Gorman, woodland conservationist; Barker W. Hopkins, area conservation-

ist; Norris R. Caryl, assistant state conservationist for watersheds; Keith O. Schmude, state soil scientist; Dr. Mannon E. Gallegly, director of the Division of Plant Sciences, West Virginia University; Dr. William Van Eck, West Virginia University Extension Service.

The *West Virginia Daily News*, with a circulation of 5,100, did much to get the word to the county’s 32,000 residents. People began to talk about the soil survey; they kept on talking and asking questions about it as the July 31 meeting approached. With each article, more interest developed, and local conservationists knew they had something big. Requests for the soil survey were coming in from throughout the county and the state and from as far away as Hawaii. Of course, many requests came from potential investors in the county.

Other public media in West Virginia also helped the survey to make the scene. Al Beaty went on television and radio with Dave McKinney. Radio spot announcements about soil surveys,

prepared by the SCS Information Division in Washington, D.C., were used everyday from July 15 to July 31 by WRON, in Ronceverte, and WSLW, in White Sulphur Springs.

A special slide talk about interpretations of Greenbrier County soils was prepared for the public meeting. In addition, five photo displays were made using the standard SCS cardboard display units—one on the soil survey in general and one each on agriculture, woodland, residential development, and recreation. The slide talk and exhibits were used later to help carry out the followup information program on the soil survey report.

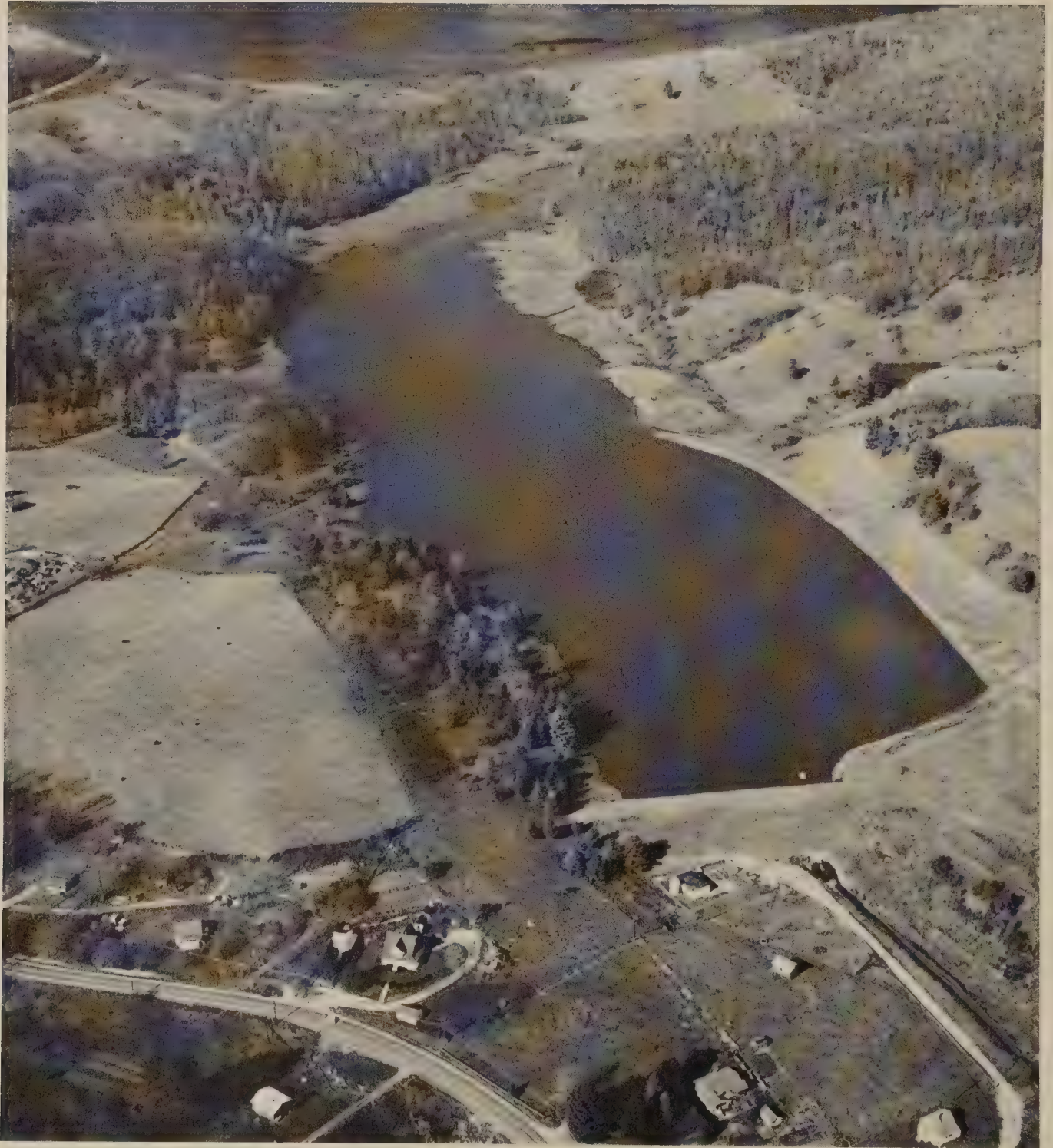
The Greenbrier soil survey was formally released to the public on the night of July 31 at Greenbrier East High School in Fairlea. About 135 people attended that public meeting, but many more already knew what the survey could do for them and their communities, mainly because of the 13 news stories.

Now, that’s the way to send a soil survey out into the world! ♦



in gathering soil data to prevent situations like this. This house was built on soils that tend to slip and slide.

Living high in Appalachia



Three mighty mountain rivers become one in Summers County, West Virginia. Where the Bluestone, the Greenbrier, and the New Rivers converge, the terrain rises abruptly as though to mark the meeting place.

The steep, rugged mountains are at once magnificent and forbidding. Not too far away, however, halfway up White Oak Mountain, a rolling plateau presents itself as a far-less forbidding site in an equally attractive setting.

Two unincorporated communities, Jumping Branch and Nimitz, have grown up on this plateau, but not without natural resource problems.

Several areas, including some homesites, were subject to flooding. A shrinking water table and increasing population threatened the quantity and quality of domestic water supplies. Despite abundant level land on the plateau, new construction was nearly at a standstill.

Today the two communities are facing a brighter future, thanks to the coordinated efforts of the residents and the Mountain-Dominion Resource Conservation and Development Project. An RC&D project measure is helping Jumping Branch and Nimitz to solve the contradiction of sometimes having too much water and more frequently having too little.

J. W. McCallister, then of Nimitz and now a railway official in Richmond, Virginia, laid the problems before the Mountain-Dominion RC&D steering committee in 1967. Soon after that a survey team from the Kanawha River Basin Party determined

that a dam on Jumping Branch Creek might solve some of the problems by preventing floods and storing municipal water.

At the RC&D steering committee's request, Wallace Cummins, an SCS soil scientist from Louisa, Virginia, studied the soils in the plateau. His 2,000-acre survey included interpretations for housing, sewage disposal, recreation, and other potential developments.

That was the initial RC&D input. Meanwhile, McCallister and a few other believers knocked on doors to awaken an interest put to sleep by years of no hope for change. The local people responded by forming the Jumping Branch-Nimitz Public Service District.

An engineering firm provided cost estimates for the local share of impoundment and water supply system costs. The Soil Conservation Service agreed to plan and finance flood-control construction. The Farmers Home Administration agreed to furnish a grant and loan to finance the water system. And West Virginia's Bluestone State Park came in as a water customer, adding the equivalent of 47 families to the 125 already signed up.

Construction of the dam started in 1970 and was finished in the summer of 1971. A \$51,000 RC&D loan, a first in the Mountain-Dominion project area, financed the local share of the impoundment. The water distribution system, with FHA aid, was completed early in 1972. Today, more than 200 households and businesses are using the water.

Success with water resources has generated other community actions in Jumping Branch and Nimitz. Groundwork is underway for a community plan that will use the soil survey as a guide. New projects, such as sewage disposal, parks, fire protection, and obtaining natural gas, are be-

By Robert A. Speich

Coordinator

Mountain-Dominion RC&D Project
Princeton, West Virginia

and John P. Carr

District conservationist, SCS
Hinton, West Virginia

ing talked about by the newly formed Jumping Branch-Nimitz Improvement Association.

About 10 new houses have been completed and are occupied. Developers have cleared land for two new subdivisions that will use water from the Jumping Branch lake.

"We've got a great future up here," said Steve Bennett, current chairman of the Public Service District board. "We're proud of our mountains, fresh air, and open spaces. With all the emphasis on the environment and land use planning these days, we plan to utilize agencies like SCS and FHA that are willing to help us become the finest community in West Virginia." ♦

This dam has helped solve for two communities in Summers County, West Virginia, the contradiction of sometimes having too much water and more frequently having too little.

The ground's the limit for an idea that started at Tuskegee, went on to Washington, proceeded to NASA, and wound up with SCS.

The idea was a new planned community to be located near north Birmingham, Alabama. Population-to-be: 42,000. The new town is not the first planned community in the Birmingham area, but it may be the most thoroughly planned community in the South.

The idea originated at the Tuskegee Alumni Housing Foundation. Marcus Dasher, vice president of the foundation, is technical director of the project. The location for the new town is ideal for suburban development because Birmingham industries and commercial areas are already nearby.

The Tuskegee foundation applied for site planning assistance from the U.S. Department of Housing and Urban Development. When the application was approved, the foundation looked for a source of technical assistance. On the advice of Alabama Senator John J. Sparkman, the foundation turned to NASA's Marshall Space Flight Center. NASA has assembled a vast array of scientific disciplines, which it agreed to use to assist in planning the new community.

The Marshall Space Flight Center took both infrared and black-and-white aerial photographs of the area and, using a stereoscope, studied the topography to determine drainage patterns and to locate outcrop areas. NASA studied the character of the subsurface rock by use of seismic devices. To determine

soil conditions, NASA turned to the Soil Conservation Service.

Birmingham is the base of operations for a two-man SCS soil surveying team, D. E. "Ed" Lewis and Cleo Stubbs. Both are soil scientists. Lewis, the soil survey leader, gave this project top priority and unpacked his trusty hand auger. He and Stubbs spent 30 man-days on the 6,000-acre project site.

The soil map that resulted is similar to that which would be prepared for a 6,000-acre farm. "In fact," reported Lewis, "it will probably become a part of our standard soil survey report for this area."

The soil interpretations are what set this map and report apart. "We compiled soil interpretations for urban uses," said Lewis, "instead of information that a farmer could use in determining which crops would be suitable for his land."

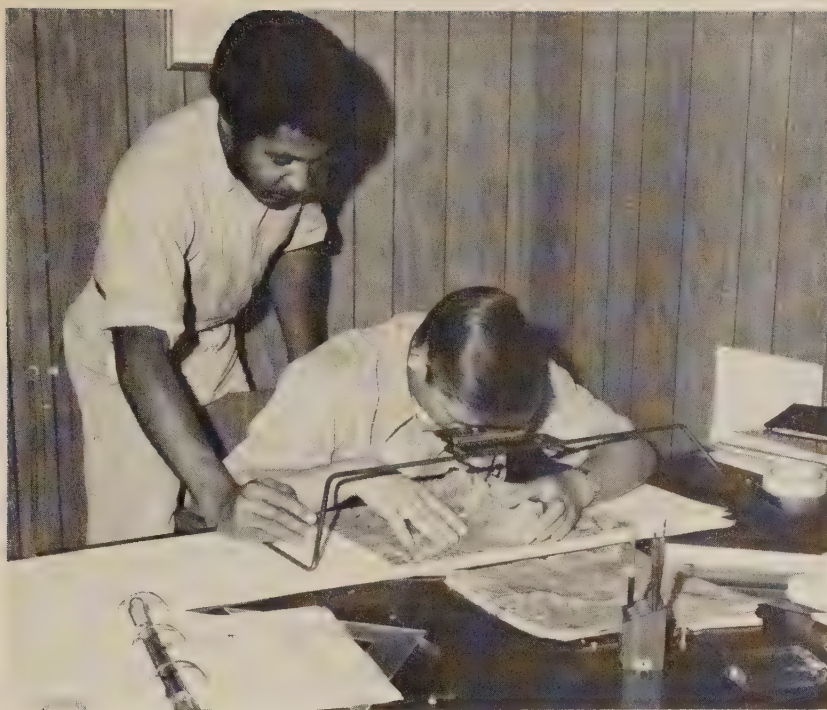
The report contains a description of the kinds of soil at the site and gives the soil limitations, such as shallowness to rock, susceptibility to flooding, slow permeability, rockiness, and steep slopes. These limitations can restrict urban development at any site.

Knowing soil depth and slope can help planners locate the best areas for dwellings and can be useful in planning the layout of underground cables, sewage lines, gas lines, water lines, and streets.

In most places, there are specific land uses that are limited by the soil. The site for this new town is no exception. Lewis pointed out that some of the soils have limitations for septic tank filter fields, sewage lagoons,

The ground's the limit

by Morris S. Gillespie
Public information officer, SCS
Auburn, Alabama



In preparing a soil survey, SCS soil scientists spend many hours at the stereoscope as well as in the field. Soil scientists Cleo Stubbs and Ed Lewis (at the stereoscope) mapped the 6,000-acre site of a new town near Birmingham.

(Below) SCS district conservationist in Birmingham, W. J. King, presents the soil data report for the new townsite to John Bensko, a geologist at NASA's Marshall Space Flight Center in Huntsville and the director of the NASA-assisted planning survey for the townsite. Looking on are James L. Daniels, a NASA environmental applications officer, and Cleo Stubbs.



sanitary landfills, and roads and streets. Some soils would corrode uncoated steel, and others would be unable to support foundations for buildings.

"These soils have a tendency to slip and slide," said Lewis. "Development should probably be restricted to the level and nearly level land and ridgetops, leaving the steep hillsides in trees."

Planners of the new town had more than soil limitations to consider. There are several faults in the area, three abandoned deep mines, several shallow outcrop mines, and some old strip mines. All of these areas have been charted to avoid problems in the future.

Practically everywhere, there are soils that have limitations for urban development. The difference here is that the limitations were recognized before development started; the restrictions imposed by soil, water, and geology were used as a basis for development. The new Birmingham suburb will be one more of a new breed of consciously developed communities. This trend toward conscious development may soon become the norm.

"Land use planning that is based on the limitations of the soil is the answer to some of the problems that plague many communities," said William B. Lingle, SCS state conservationist for Alabama. "And we believe that it takes cooperation among many state and federal agencies in this planning effort to bring about more livable communities."

The ground's a limit, but it's a limit you can build the future on. ♦

Reconnaissance soil surveys aid planning in Nevada

Nevada, like other western states, is experiencing a continuing migration of people and an explosion of physical development unparalleled in history.

Planners and developers are asking for objective resource data for this relatively unexplored part of the nation. There are only vague ideas of the kinds of soils in vast areas, yet a certain minimum amount of information about the kinds and extent of dominant soils is necessary if the land is not to be misused.

Fortunately, with the present SCS soil survey staff in Nevada and the use of modern techniques, a soil survey of the state adequate for broad-area planning can be completed within 10 years.

Environmental setting

Nevada was once considered part of the vast wilderness that separated the civilized seaboard of the nation. Its few residents found a peculiar spaciousness and freedom that lately have attracted an influx of people.

The state is huge—about 71 million acres. About one-third of the state is mountainous, and nearly two-thirds is made up of gently sloping basins. About 5 percent is rolling plateau land.

Only recently have high-speed transportation routes crossed the mountain barriers, nullifying distances and allowing the types of urban-industrial settlement that characterize other parts of the nation. Yet settlement and development still face the old problems of climate and appropriate use of soil-landscapes.

Nevada is arid. This prevailing fact is reflected by a desert shrub vegetation of limited productivity. Aridity restricts cultivated agriculture to several small to moderate-sized irrigated areas.

Besides aridity, cool temperatures and a short growing season limit crop production in the higher basins.

The soils of Nevada are mostly dry for extended periods in summer and fall, but otherwise they vary widely in texture, depth, permeability, salt and carbonate content, organic-matter content, and water-holding capacity. Some have a hardpan at a shallow depth; others are shallow to bedrock. Extensive areas of medium-





by **F. F. Peterson**

Associate professor of soil science
University of Nevada
Reno, Nevada

E. A. Naphan

State soil scientist, SCS
Reno, Nevada

and **B. J. Vasey**

Planning engineer
Department of Conservation
and Natural Resources
Carson City, Nevada



(Top) These broad alluvial fans of the Penoyer Valley are characteristic of vast acreages in the basins of Nevada. The gentle slopes are excellent for agriculture or urban expansion, but in places soil problems could restrict use. Here the soils are fair or not acceptable for irrigation but suitable for urban development. The vegetation is shadscale, budsage, and galleta grass.

(Extreme left) A high water table and the prominent salt efflorescences on the surface of this alkali soil in the Railroad Valley are evidence of soil limitations for most uses. Greasewood and saltgrass are among the few plants able to persist on these soils.

(Left) The distant reaches of this plateau in northwestern Nevada illustrate the physical problem of gathering soil survey data for comprehensive planning.

textured soils on alluvial fans and in basin-fill plains have thick gravel deposits at a shallow depth.

Wet, salty, finer textured soils commonly occur in and around the playa sinks of the numerous internally drained basins. Fine-textured soils with slow permeability occur in the mountains, on the foothills, and on high, old, alluvial fans. Each of these soil peculiarities suggests different suitabilities.

The contrasting patterns of climate and soils are a major factor in expansion and development. Because urban and agricultural development occur in unexpected locations, comprehensive planning to prevent misuse or economic disaster is needed for exceedingly large areas.

The very magnitude of the Nevada landscape is an impediment to rapid collection of detailed soil survey data. But an essential amount of soil survey data can be gathered using less detailed soil survey procedures.

The basins and their surrounding mountainous watersheds range from roughly several thousand to about 2 million acres in size; most are large. Within these basins, soils occur in large repetitive patterns on alluvial fans, basin-fill plains, beach plains of glacial age, and foothills that are miles in extent. Physiography and vegetation are not sufficient criteria for predicting soil occurrence. But when these surface features are considered in combination with pits dug along traverses or on selected landscape positions, they allow prediction of patterns of soils over large areas.

Mountainous terrain is physically more difficult to study, but salient soil properties can be projected over large areas once genetic relations are established. Observation of landscape features cannot be substituted for identification of soil properties in pits;

the two procedures must be combined.

Uses and needs for soil survey interpretations

Detailed soil surveys have been designed to have a high content of information. A great number of different interpretations are possible. Detailed soil surveys can be used to assess soil suitability or limitations for rather small parcels—half an acre to 10 acres—or they can be generalized by grouping similar soils or soil patterns to show single or multiple factor suitabilities for areas of several thousand acres.

Because they are based on identification of observed properties of the soils, rather than on interpretations made at the site, or on mechanical enumeration of selected properties, that is, factorial identification, detailed surveys can be used as a basis for making interpretations about many soil-related problems. Traditionally, detailed soil surveys have been used for operational planning and management of small parcels of land.

Nevada today is faced with burgeoning planning needs and efforts but has few resources to collect soil survey data. Essentially all of the state is subject to development, but its population of about half a million is concentrated in the Las Vegas and Reno-Carson City areas. Only 13 percent of the state is privately owned; the rest is federal land administered by several government agencies. Presently, areas needing soil survey data for planning include about 100,000 acres each in Reno and Las Vegas, 204,000 acres in the Tahoe regional planning area, 3,140,000 acres in Churchill County, and the 70 million acres of a state water plan.

At present, about 7 million acres have been mapped in detail, another 7 million acres have been

mapped for reconnaissance soil surveys, and 57 million acres remain unmapped. Of the unmapped acres, about 4 million are foreseeably subject to urban expansion or conversion to intensive agriculture, thus warranting detailed mapping. In the remaining 53 million acres, enough soil survey data must be collected to meet the needs of land use planners and to provide guidance in the selection of areas that have potential for intensive use. Fortunately, the scale at which this kind of planning is made allows the use of less detailed soil survey data. A reconnaissance soil survey will identify the more important properties of the dominant soils and their approximate location and extent.

Reconnaissance soil surveys in Nevada

Reconnaissance soil surveys display and record geographic patterns of soils, their morphological properties, and interpretations with great enough specificity of location to allow planners to block out areas of peculiar suitability or problems. The surveys show where major kinds of soil are located and their extent, the shape of large areas, and the distance and different terrain separating these areas. They suggest engineering and agronomic techniques needed for land use development.

The level of precision of these data is commensurate with that of comprehensive plans. Planners intend to flag areas within which ordinances or criteria for land use will be applied to achieve goals and objectives. They look to the larger economic and environmental impacts of development rather than to site-by-site judgments.

Soil surveys have proved to be useful political devices for planners. They provide technical support for decision making and

present soil resource data in geographic patterns that can be understood by the people. But to be useful, soil survey data must be available *early* in the planning process.

The most experienced soil scientists can map from 8,000 to 15,000 acres per man-day using reconnaissance soil survey procedures, or about 1 million acres per man-year. In comparison, detailed surveys progress at about 160 to 200 acres per man-day, or 50,000 to 70,000 acres per man-year. The economics for making reconnaissance soil surveys in Nevada are clear.

The nature of reconnaissance soil surveys

Reconnaissance soil surveys differ from the more familiar detailed surveys in the *generality* of their mapping units and the identification of the soils within them. They also differ by their intensity of field study; fewer soils are described in pits, and patterns of soils are projected over larger landscape elements without drawing boundaries of individual soils within delineations on the maps.

Reconnaissance soil surveys, like detailed surveys, consist of (1) a soil map based on field study and (2) a report of soil properties, environmental features, and interpretations.

Generality in soil mapping has a somewhat unexpected value in comprehensive planning. Generality is achieved by ignoring small bodies of odd but striking soils and by combining noncontrasting inextensive soils with the dominant soils.

The Nevada reconnaissance soil survey

In 1969, the Nevada Cooperative Soil Survey initiated a reconnaissance soil survey of the



entire state with active support from the Division of Water Resources, Nevada Department of Conservation and Natural Resources. Objectives of the survey included soil survey data inputs to a 4-year state water plan. The plan requires rather specific soil suitability evaluations for agricultural or urban expansion in several large basins, in addition to a general, statewide assessment of soils suitable for irrigation.

Because water is such a critical resource in Nevada, 49 reconnaissance soil survey areas were delineated to accord with the boundaries of groups of hydrographic areas used for water planning rather than with the county boundaries that were drawn during the early mining days in little conformity to physiography. These survey areas range from 369,280 to 2,305,920 acres; most are about 1,500,000 acres.

Field mapping is done on aerial photos at a scale of 1 inch equals 1 mile, and the soil maps are published at about one-quarter of this scale using topographic base maps prepared by the U.S. Geological Survey. The reports include a discussion of major environmental features, character-

When this photograph was taken in 1962, suburbs had already spread out from Reno, up onto the high, old alluvial fans that surround the lower valley. The soils on these fans exhibit marked shrinking and swelling and have caused breakage of pavements and foundations; they are unsuited for septic tank filter fields. Reconnaissance soil surveys flag such areas for planners. The open space shown here is now taken up by housing.

istic soil features of the area, a general soil map at a scale of about 12 miles to 1 inch, and tabular description of soil properties and soil interpretations.

One reconnaissance soil survey has been published, one is in press, and three are in preparation. ♦

Buena Vista is looking better

The people of Buena Vista, Virginia, are converting an old dairy farm in a picturesque setting in the Blue Ridge country into a 266-acre park.

Glen Maury Park is a project of the Virginia Outdoors Plan. It is funded 50 percent by the U.S. Department of the Interior's Bureau of Outdoor Recreation, 25 percent by Virginia's Commission of Outdoor Recreation (COR), and 25 percent by the city of Buena Vista.

The idea was conceived by B. C. (Bud) Nelson, Jr., shortly after he took over the duties of city manager in 1970. The city had just recently purchased the farm but had no definite plans for it. Nelson sold his idea to the City Council and engaged an engineering consultant to draw up some preliminary plans. With the plans tucked under his arm, he took off to Richmond to get COR approval.

Establishing the park on the site of the former family dairy operation will bring about a shift in land use that better suits the soils of the entire tract.

The project, estimated to cost \$800,000, will be carried out in three phases.

The first phase, for which \$300,000 is already available, includes the construction of picnic areas, an overnight campground, hiking trails, a horse show ring, a playground, roads, parking areas, and water and sanitary facilities.

Phase two includes tennis courts, a football field, baseball diamonds, an outdoor theater, and a swimming pool. A golf

course, ski slopes, and a sled run will come with phase three.

The plans also include an outdoor classroom and nature study areas along the hiking trails.

The picnic areas and campground, with water and sewer lines and sanitary facilities, were in use by Labor Day of 1972.

The campground has 75 sites with water and electric hookups, picnic tables, and grills; two comfort stations with hot and cold showers; and laundry facilities.

Early in the planning stage City Manager Nelson asked the Natural Bridge Soil and Water Conservation District for information about the soils on the farm. The previous owner had been a cooperator with the district, so the Soil Conservation Service had already surveyed the soils. SCS had only to interpret the soil data for new uses.

The Natural Bridge District gave technical help in the layout for roads, trails, and campground and in land shaping and grading

by A. Bertram Hawkins
District conservationist, SCS
Lexington, Virginia

and recommended cover treatment for the various uses. It will help also in the development of the outdoor classroom.

The project has provided summer employment for young people of the community through the Neighborhood Youth Corps. In the past two summers, 80 youths have been employed to help prepare Glen Maury Park for the Labor Day opening.

"Last Labor Day, close to 15,000 people came to Glen Maury Park," said Shuler A. Kizer, mayor of Buena Vista. "The park is possibly our greatest asset. It is unique in that it has potential for providing year-round recreation. ♦

These poles, standing like sentries over the city, will hold up a two-story open air pavilion for band concerts.



Terraces

in town

They call our soil sugar clay. There have been lawsuits in Council Bluffs brought on by this hard-to-handle loess soil—in one case, a house had nearly split in two when the fill material settled.

When the First Southwest Iowa Service Corporation decided to build Horizon Hills, an 18-acre development, right along the top of a bluff—above a residential area—acute runoff and sediment problems were visualized.

The corporation is hoping to solve such problems with 1,200 feet of tile intake terraces. Five terraces have been installed to let water down safely to a storm sewer about 50 feet below the development. One street has been designed to serve as a terrace.

Leland Lykke, president of the corporation, said the decision to terrace was a joint one between himself, contractor Larry Tweedt, and consulting engineer Ken Milford of H. G. McKeown and Associates.

Tweedt is president of the Council Bluffs Homebuilders Association. After a meeting of the association last spring, he knew he could count on the Soil Conservation Service for seeding recommendations and other help. At that meeting the SCS district conservationist gave a slide talk on land use and passed out an urban land use guide, which was developed by the West Pottawattamie Soil Conservation District and approved by the Council Bluffs City Council. The guide includes an urban land use code and discusses topics such as drainage, site preparation, grass cover, mulching, and rock retaining walls.



Milford, the consulting engineer, knew where to place the terraces to fit the 51 lots of the Horizon Hills development. He asked SCS for design criteria for the fills for water and silt storage and for determining the size of tile needed to handle a 4-inch rain in 4 hours. Easements were reserved for temporary water backup at the inlets.

Tweedt admitted that the terraces definitely increase development costs. "But they're necessary—I've seen what one big rain can do to a developing area," he said.

He and Lykke have had people in the residential area below Horizon Hills ask about runoff from the development. It feels very good, they agree, to be able to tell those people that potential runoff and sediment problems were planned for in advance—and prevented. ♦

The author is shown inspecting tile intake terraces at an 18-acre development with Leland Lykke, president of the corporation building the development.

by Cal Cox
District conservationist, SCS
Council Bluffs, Iowa

Dream house becomes haunted house

"I'm sure my house is haunted," said Mrs. William Miller to SCS soil scientist, Jesse Newlun.

"When we moved in, the house was perfect. Then strange things began to happen. Right now, my furniture will not stay level, and cabinet doors pop open all of a sudden. We hear strange noises throughout the day and night."

In June 1970, Mr. and Mrs. Miller moved into their new house in Siskiyou County in northern California.

About a year later, disaster struck. Structural damage to the house had occurred and was getting worse. A room divider had separated from the ceiling; it could easily be moved back and forth by hand. And the bathtub had separated from the wall by half an inch. The living room floor in places was almost an inch lower than it had been.

What was happening? The contractor who built the house could not explain the failures. The house had been built to local code. The usual inspections had been made during construction.

The Farmers Home Administration had financed the house and was a bit concerned about its

investment and about house owners in that area.

FHA asked the Soil Conservation Service for help in solving this peculiar problem.

A soil scientist and an engineer from the local SCS office studied the soil map of the area in detail.

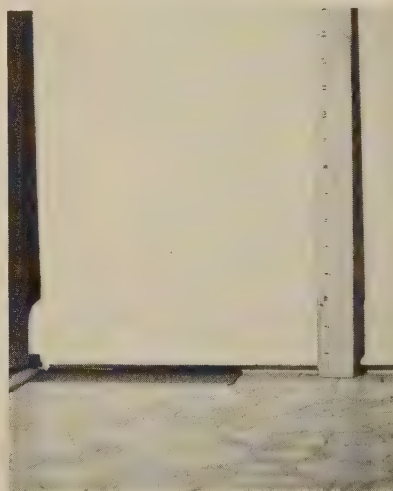
The "ghost," it turned out, was the soil—something that nearly

everyone takes for granted. Nobody had thought to investigate to be sure the soil was suitable for dwellings.

In this particular area, the soil is a type of clay that expands when wet and contracts on drying. The soil moves and cracks severely when it dries; cracks up to 3 inches wide and 4 or 5 feet deep appear. The soil rises and falls several inches in the course of wetting and drying and does so unevenly. This causes areas to develop high and low spots.

To make matters worse, the soil under the Millers' house tends to be dry, but the soil at the edge of the house is either wet or dry depending on the season or the amount of water on the ground.

Damage to the Millers' house could have been prevented. If the soil had been studied and its characteristics identified, a proper foundation could have been designed and built. The house would have cost the Millers a bit more, but wouldn't it have been worth it? No one wants to live in a "haunted" house. ♦



The floor in this house dropped half an inch to an inch in places because the house was built on a clayey soil.

conservation

in action

Review, review, review

Land use review is a familiar phrase to SCS people in New City, New York, and to supervisors of the Westchester and Rockland Soil and Water Conservation Districts in the rapidly developing area north of New York City.

Understandably, proper land development is a major concern in the area. "Careless developers can cause many problems," said Bob Jonas, SCS district conservationist. "All too frequently they are not concerned about the stability of steep slopes. In some developments, they do not provide surface drainage. They have put houses on flood plains or in areas where there will be wet basements. And in many places they do nothing or very little about erosion and sedimentation during construction."

"To avoid such situations, we must get soil information to planners in the early stages," said Peter Eschweiler, commissioner of Planning for Westchester County and secretary of the Westchester County Soil and Water Conservation District. But until recently the county didn't have a modern soil survey. To obtain the information, Bob Jonas or one of his assistants would have had to make an on-site investigation of the soils for each development in the county.

Recently, under the sponsorship of the Westchester County government, a soil survey of the county was completed. The coun-

ty's contribution of \$75,000 accelerated the survey operations.

"For the Westchester County Community College, the locations for three new buildings, including parking lots, were picked on the basis of soil suitability," said Eschweiler. "And because we had soil data available, we were able to pick a suitable site for new student and staff housing at a county medical college. Some drainage proposals for this project were rejected on the basis of the soils."

Gratifying though these results were, the reviewing of subdivisions in such a large area was still a major job. To relieve some of the pressure on the SCS staff, the Rockland County Soil and Water Conservation District worked out a financial arrangement to bring in an additional resource conservationist, George Lee, to work specifically on development problems in that county.

Within 5 months a busy Lee had completed almost 200 land use reviews. These covered 842 dwelling unit sites and 28 commercial unit sites on 960 acres of land.

As a result of recommendations made in the conservation district's technical reports, many plan revisions were required by Rockland County town planning boards. The revisions include surface drainage improvements, better grading plans, better protection against flooding, and improved control of sediment, erosion, and runoff onto streets and adjoining properties.

Much of Lee's work has been in Clarkstown. "SCS has been of material assistance to the

town," stated Charles Cassels, secretary of the Clarkstown Planning Board. "The SCS staff does a thorough job of review. As a result, some truly dangerous situations have come to light. These could not have been discovered through the town's efforts alone."

Putting a rough estimate on benefits of the program to Clarkstown, Cassels said, "Several million dollars will be saved by the work of SCS and our conservation district. And the saving of a million dollars in flood prevention is really a saving to the private citizen, because he won't have to pay for flood damages through his taxes."

To Cassels, land use reviews are part of an increasingly more streamlined and beneficial planning process. "All planning is 10 years too late," he said. "But as conservation districts and agencies like SCS have a greater influence on town planning, the time span becomes less and less between creation of a land use problem, recognition of the problem, and solution of the problem. Finally, the three occur nearly at the same time."—VINCENT J. PRICE, *Information Division, SCS, Washington, D.C.* ♦

Local money accelerates soil surveys in North Carolina

Seven of the nine soil surveys now underway in North Carolina

are being accelerated by substantial amounts of money appropriated by county governments.

The soil survey of Cumberland and Hoke Counties, which include Fort Bragg Military Reservation, is being expedited by money from the two counties and the Department of the Army. The

Mecklenburg County survey, which will get started next March, will also get a boost from local funds.

The local money supplements soil survey money provided by the Soil Conservation Service and North Carolina State University.

Most of the money has come

from areas where the need for soil information is rapidly increasing. If soil scientists and other personnel are available, a soil survey of such areas can be started several years ahead of schedule.—BOBBY T. BIRDWELL, *assistant state soil scientist, SCS, Raleigh, North Carolina.* ♦

Organic trees

An 82-year-old eastern Kentuckian is managing a large acreage of hilly woodland with little more than an ax.

As a devoted naturalist, Edward Holbrook of Morgan County likes to hike through his steep wooded hills to look at the trees or watch the wildlife and insists on silviculture without modern conveniences. He says he gets his best tips on woodland management from the Soil Conservation Service, but he wants no short cuts, thank you.

Holbrook has done without treating his land or trees with chemicals.

When Holbrook retired in 1954 after teaching school and serving as a field agent for the Federal Land Bank, the great potential of his large forest beckoned him. At the age of 65, with an ax over his shoulder and his dog leading the way, he cut vines, culled trees, and built several miles of trails and fire lanes. But he left intact long sections of crooked split-rail fences that his father put up in 1908.

"My efforts," says Holbrook, "are to get rid of strangling vines and to kill off undesirable trees that crowd out desirable ones. But small undergrowth and good forest-floor litter are needed to absorb water, enrich the soil, and stop erosion."



Holbrook's achievements have been steady and strong. By 1958, he had improved 400 acres of woodland and planted more than 30 acres in trees. Today, he has completed 720 acres of woodland improvement and has planted nearly 200 acres of white pine and black walnut seedlings.

His future goals include planting black walnut trees in a bottom-land field in combination with other vegetation that will provide food and cover for deer, squirrels, birds, and rabbits. Also with wildlife in mind, Holbrook abstains from felling nut-bearing and den trees.

Now Holbrook is ready to sell

Edward Holbrook, octogenarian, rests near three chestnut stumps from which the split-rail fence in the background was built by his father about 1908.

his prime timber. He has some of the finest, tallest, straightest poplar, maple, oak, hickory, and beech to be found anywhere.

The naturalist is a true conservationist. "I manage my woods well," he says. "I won't allow trees to decay and be wasted."—BERLYN BROWN, *district conservationist, SCS, Burkesville, Kentucky*, and CHARLES FOSTER, *staff forester, SCS, Lexington, Kentucky.* ♦

Review

Books

Compaction of Agricultural Soils. 1971. *American Society of Agricultural Engineers* (2950 Niles Road, St. Joseph, Mich. 49085). 471 pp., illus. \$35.

If there is anything about soil compaction you always wanted to know but didn't know where to find it, this monograph is for you—even though it does not deal with deliberate compaction for construction.

Written by 23 engineers and soil scientists, this book gives a comprehensive, up-to-date review of the status of knowledge not only about soil compaction but also about almost everything that is affected by compaction or related to it. Approximately 800 references are cited.

What compaction is, how it is measured, and how it is induced—not only by farm equipment and livestock but also by natural phenomena—are treated in some detail. The authors explain how and to what extent compaction affects content and transmission of moisture, air, and heat; how it affects the soil nutrient status; and how it relates to soil strength.

Not neglected are the relationships of soil compaction to plants—to the emergence of plants from seeds, to root development as affected not only by the resistance offered by the soil itself but also by aeration, soil temperature, moisture supply, and nutrient supply as affected by the compaction status, or bulk density, of the soil.

As expected, the effects of tillage on compaction are explained but rather unexpected are the in-depth discussions of shrink-swell and freeze-thaw phenomena and their relationships to soil condition.

Although, in the last chapter, it gives some practical advice about how to minimize compaction, this

monograph is not a how-to-do-it book. It is a monograph for researchers and others who are interested in what is known about compaction and its complex relationships.—ARNOLD C. ORVEDAL, former assistant director, Soil Survey Interpretations Division, SCS, Washington, D.C.

New publications

Conservation Practices—Signs of Good Hunting and Fishing. By Lawrence V. Compton, Felix Summers, and Philip F. Allan. 1972. *USDA Program Aid 1012*. 32 pp., illus. \$0.20. This publication supersedes PA-400, "Soil Conservation Tips for Sportsmen." It tells why stripcropping, hedges, windbreaks, field borders, and ponds are "signs" of good wildlife land. Included in the booklet are tips for hunters and fishermen on improving their relations with farmers and ranchers.

Maintaining Subsurface Drains. 1972. *USDA Leaflet 557*. 8 pp., illus. This leaflet supersedes Leaflet 347, "Keep Your Tile Drains Working." It discusses common trouble spots and maintenance of inlets, drains, outlets, and ditches; suggests methods for mapping a drainage system.

Environment Restored, Yazoo-Little Tallahatchie Flood Prevention Project, Mississippi. 1971. *USDA Forest Service*. [16] pp., illus. in color. To restore the desolated environment in north-central Mississippi, the Soil Conservation Service and the Forest Service working through soil conservation districts assumed on-the-ground direction for the Yazoo-Little Tallahatchie Flood Prevention Project. This report summarizes the accomplishments of the project since its inception in 1944.

Millions of trees were planted; timber stands improved and land returned to agricultural production amounted to thousands of acres; and $\frac{3}{4}$ of a million brush dams were built to stop erosion. Many ponds, water diversions, and drainage ditches were built. Out of the restored land came forest products, crops and cattle, and recreation that benefited the area and increased the economy manifold.

Public Land Statistics, 1971. *U.S. Dept. of the Interior, Bureau of Land Management*. 188 pp., illus. \$0.75. Presents 127 tables on the history, status, and use of public lands in the United States and possessions.

Research Needs for Irrigation Return Flow Quality Control. By Gaylord V. Skogerboe and James P. Law, Jr. 1971. *U.S. Environmental Protection Agency, Water Pollution Control Research Series*. 98 pp., illus. \$1. This report sets out to define the major geographic areas where irrigation return flow problems exist, to specify the major water quality problems arising from irrigation return flows and how these differ by regions, to propose potential solutions required to alleviate and/or control water quality degradation by irrigation, and to define specific research activities most urgently required to design and implement control measures or potential solutions to critical problems.

Water Rights Laws in the Nineteen Western States. By Wells A. Hutchins. 1971. *USDA Misc. Pub. 1206, Vol. 1*. 650 pp. This work presents a comparative analysis of the constitutional provisions, statutes, reported court decisions, and some administrative regulations, prac-

tices, and policies regarding water rights laws in the 17 contiguous western states plus Alaska and Hawaii. The analysis includes the nature of such water rights and their acquisition, control, exercise, transfer, protection, and loss. In addition to the relevant state laws, federal, interstate, and international matters are also discussed. An extensive appendix includes summaries of selected components of the water rights systems of each state.

Wastewater Management by Disposal on the Land. S. C. Reed, Coordinator. 1972. *U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (Hanover, New Hampshire) Special Report 171.* 184 pp., illus. This report provides a technical assessment of land disposal methodologies for use in the Corps of Engineers' Wastewater Management Program. Nine essentially independent chapters assess in detail critical operational parameters and ecosystem components for land disposal concepts. A summary discusses disposal techniques and ecosystem responses.

Three basic techniques of land disposal are considered—spray irrigation, overland runoff, and rapid infiltration—and the conclusion reached is that any one of the three meets quality standards if proper site conditions exist and proper operational criteria are employed. Of the three application modes, spray irrigation offers the highest degree of reliability and potential longevity. Overland runoff, rated second, may require operational manipulation to realize the same useful life as spray irrigation. Rapid infiltration requires the most extensive and thorough site investigation to insure that favorable conditions exist.

Effects of Noise on Wildlife and Other Animals. By Memphis State University. 1971. *U.S. Environmental Protection Agency.* 74 pp. \$0.70. This report discusses the effects (auditory and nonauditory) of noise on laboratory animals and farm animals (mammals and poultry). It discusses also the demonstrated and suspected effects of noise on wildlife (mammals, birds, fish, and insects). For the purpose of this report "wildlife" is defined as those animals that were not born or hatched in captivity.

The literature search reported here was concentrated on the period from 1950 to the present, but earlier pertinent studies are also reviewed. Relevant and readily obtainable reports from foreign literature are included. A detailed report of libraries, information retrieval services, source materials, and persons and agencies contacted for information is presented in the appendix.

In general, few if any of the reported or suggested effects of noise on animals benefit the animal or increase his chances for survival. Some, in fact, might possibly lead to his death or decrease his chances of survival.

How To Control Wind Erosion. By N. P. Woodruff, Leon Lyles, F. H. Siddoway, and D. W. Fryrear. 1972. *USDA Agr. Inf. Bull.* 354. 22 pp., illus. \$0.20. Supersedes Farmers' Bulletin 2169, "How To Control Soil Blowing." Wind erosion occurs in the Great Plains; around the Great Lakes in Michigan, Wisconsin, and Ohio; along the eastern seaboard; in the Southeastern Coastal Areas; and in the Northwest, especially in newly irrigated areas. This bulletin discusses ways of controlling wind erosion—such as by stubble mulching, minimum tillage, stripcropping, crop ro-

tation, wind barriers and shelterbelts, and landforming and benching—on dryland cultivated soils, on irrigated lands, on vegetable and specialty croplands, on grazing lands, and on sand dunes and other problem areas.

Agricultural Prices, 1971 Annual Summary. 1972. *USDA, Statistical Reporting Service Pr 1-3(72).* 174 pp. Summarizes the latest available monthly, season, and annual prices that farmers receive for their commodities.

1972 Handbook of Agricultural Charts. *USDA Agr. Hbk.* 439. 144 pp., illus. \$0.65. Contains 170 charts and 117 tables depicting the domestic situation, foreign production and trade, population and rural development, the family, and commodity trends.

Soil survey

DeKalb County, Tennessee. By William C. Moffitt, James F. Brasfield, Jesse F. Campbell, and Roy K. Moore. 1972. *Soil Conservation Service in cooperation with the Tennessee Agricultural Experiment Station.* 64 pp., illus.; maps 4 inches to the mile (1:15,840).

Pickens County, South Carolina. By Huger S. Byrd. 1972. *Soil Conservation Service in cooperation with the South Carolina Agricultural Experiment Station.* 70 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Marion County Area, Oregon. By Lynn H. Williams. 1972. *Soil Conservation Service in cooperation with the Oregon Agricultural Experiment Station.* 132 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. By Donald E. Foote, Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens. 1972. *Soil Conservation Service in cooperation with the University of Hawaii Agricultural Experiment Station*. 232 pp., illus.; maps 0.25 inch to the mile (1:253,440).

Dawson, Lumpkin, and White Counties, Georgia. By C. L. McIntyre. 1972. *Soil Conservation Service and Forest Service in cooperation with the University of Georgia, College of Agriculture, Agricultural Experiment Stations*. 106 pp., illus.; maps 4 inches to the mile (1:15,840).

Northern Santa Barbara Area, California. By Gordon E. Shipman. 1972. *Soil Conservation Service in cooperation with University of California Agricultural Experiment Station*. 182 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Van Wert County, Ohio. By A. R. Brock and Lawrence A. Tornes. 1972. *Soil Conservation Service in cooperation with the Ohio Department of Natural Resources, Division of Lands and Soil, and the Ohio Agricultural Research and Development Center*. 73 pp., illus.; maps 4 inches to the mile (1:15,840).

Lake County, Indiana. By Ival D. Persinger. 1972. *Soil Conservation Service in cooperation with the Purdue University Agricultural Experiment Station*. 94 pp., illus.; maps 4 inches to the mile (1:15,840).

Canyon Area, Idaho. By T. W. Priest, C. W. Case, J. E. Witty, R. K. Preece, Jr., G. A. Monroe, H. W.

Biggerstaff, G. H. Logan, L. M. Rasmussen, and D. H. Webb. 1972. *Soil Conservation Service in cooperation with University of Idaho College of Agriculture and Idaho Agricultural Experiment Station*. 118 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Starr County, Texas. By Charles M. Thompson, Russell R. Sanders, and DeWayne Williams. 1972. *Soil Conservation Service in cooperation with the Texas Agricultural Experiment Station*. 62 pp., illus.; maps 2.62 inches to the mile (1:24,000).

Meetings

January 1973

- 7-11 National Association of Home Builders, Houston, Tex.
- 10-11 National Council of Farmer Cooperatives, Orlando, Fla.
- 22-25 National Woolgrowers Association, Washington, D.C.
- 25-27 American National Cattlemen's Association, San Antonio, Tex.
- 26 National Highway Research Board, Washington, D.C.
- 28-Feb. 2 American Society of Civil Engineers, Water Resources Conference, Washington, D.C.
- 31-Feb. 3 Catfish Farmers of America, New Orleans, La.

February

- 3-5 National Navigation Conference of Water Resources Congress, New Orleans, La.
- 4-9 Society for Range Management, Boise, Idaho
- 5 American Geographical Society, New York, N.Y.
- 6-8 National Dairy Housing Conference, East Lansing, Mich.
- 11-15 National Association of Conservation Districts, Las Vegas, Nev.
- 18-21 Sprinkler Irrigation, Technical Conference, Dallas, Tex.
- 20-22 National Agricultural Outlook Conference, Washington, D.C.
- 21-23 Family Camping Federation, Nettles Island, Stuart, Fla.
- 24-28 American Association of School Administrators, Atlantic City, N.J.
- 25-28 National Association of Regional Councils, Minneapolis, Minn.
- 28-Mar. 2 Land Improvement Contractors of America, New Orleans, La.

March

- 3-6 Hardwood Plywood Manufacturers Association, Disneyworld, Orlando, Fla.
- 3-6 American Camping Association, Philadelphia, Pa.
- 9-15 Associated General Contractors of America, San Francisco, Calif.
- 11-14 Farmers Union, Omaha, Nebr.
- 11-16 American Society of Photogrammetry, Washington, D.C.
- 11-17 National Wildlife Week.
- 16-18 National Wildlife Federation, Washington, D.C.
- 17-28 American Association of School Administrators, San Francisco, Calif.
- 18-21 The Wildlife Society, Washington, D.C.
- 18-21 North American Wildlife and National Resource Conference, Washington, D.C.
- 18-21 Association for Supervision and Curriculum Development, Minneapolis, Minn.
- 28-30 No-tillage Conference, Soil Conservation Society of America, American Society of Agronomy, American Society of Agricultural Engineers, and National Association of Conservation Districts, Detroit, Mich.
- 30-Apr. 3 National Science Teachers Association, Detroit, Mich.



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Recon . . .

Will we perish in our own pollution? "The most advanced culture is the greatest sinner and the most backward when it comes to destroying our environment," say L. J. Murphy and C. V. Wright, civil engineers at the University of Missouri (Columbia). "We are destroying it at a ratio of ten to one as compared to the Asian peasant.

"Many immediate causes of pollution can be controlled in time. But, pollution has underlying human causes that are less amenable to change such as exploding population and a degree of carelessness exhibited by no other species."

Air pollution, down; water pollution, up. The President's Council on Environmental Quality has submitted its Third Annual Report to the President and Congress, predicting that expenditures of more than \$287 billion will be needed between 1971 and 1980 to control pollution. Last year's CEQ report had set the figure at \$105 billion for the period 1970-75. Most of the increase in the newest estimate is attributed to the post 1975 period and the addition of \$9.6 billion

in two new categories—water pollution from livestock feedlots and from construction sedimentation.

One of the more positive notes in the report was the news that air pollution conditions have improved. But water pollution from nutrients was said to be worsening.

Bear-ly a millionaire. Smokey has joined the millionaire's club. The nation's symbol of fire prevention has earned his millionth dollar from royalties collected over the past 10 years. In 1952 a law made it illegal to use Smokey's symbol without permission from the Forest Service. For any licensed commercial product sold, a royalty fee is collected and put into a special fund to help promote the cause of forest and range fire prevention. Similar legislation when passed by the Congress will help Woodsy Owl build a war chest for his nationwide fight against pollution.

Wind barriers. Three or four rows of flax spaced 15 to 30 feet apart have been used as wind barriers in summer fallow in one North Dakota county for 5 years. Through SCS efforts, the practice is gaining acceptance throughout the state.

It'll be green in spring. There are ways to protect turfgrass areas, such as golf greens, during winter. After conducting winter field trials and laboratory experiments, James B. Beard, a crop scientist at Michigan State University, reported that viscose-rayon fiber covers, viscose-rayon-polyester covers, and excelsior blankets protect the grass satisfactorily.

Crisis in the parks. Speaking to the National Recreation and Parks Association, James Watt, director of the Interior Department's Bureau of Outdoor Recreation, said that BOR is accelerating development of the Nationwide Outdoor Recreation Plan to help identify recreation requirements, facilities, and needs for the foreseeable future. "This plan alone will go far toward addressing the recreation crisis because it will tell us what the federal, state, and local governments, and the private sector, can do to meet the growing demands for recreation facilities."

Watt said that the \$300-million-a-year Land and Water Conservation Fund, which BOR administers, has enabled more than 2 million acres of land to be acquired by federal, state, and local governments for public recreation.

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Conservation

U. S. Department of Agriculture/Soil Conservation Service/January 1973



This month SOIL CONSERVATION is featuring an article by David G. Unger explaining the sediment control institutes to be held in most of the states by the end of 1973. Unger is with the National Association of Conservation Districts.

Charles Phillips, a soil conservationist in the Washington, D.C. office, in his article gives us the SCS position in the pollution picture.

Vincent Price has written a piece about an excellent practice—keeping storm water on the site where it falls. Montgomery County, Maryland, is doing it—and Denver, and Chicago. It's worth reading about.

Look for the SCS annual report in the February issue of SOIL CONSERVATION.

COVER: A residential development in Montgomery County, Maryland, boasts of 13 ponds constructed to enhance the natural setting and to store storm water. The ponds double as sediment-catching basins during construction. See "Storm water, hold it!" beginning on page 123.

- 115 From the Administrator
More work, less emotion
- 116 A new look at sediment control
by David G. Unger
- 120 Environmental concerns in conservation planning
by Charles G. Phillips
- 123 Storm water, hold it!
by Vincent J. Price
- 126 On the strip mining front: achievement in the trenches
by James Thorn
- 128 Boy power in conservation
by Laurence A. Arpin
- 130 Treat your waste right
by Gene Warren
- 133 Help yourself
by Richard L. Thompson
- 134 Review
- 135 Meetings
- 136 Recon

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EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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More Work, less emotion

Pollution comes in many forms.

So do pollution fighters.

There are the alarmists—and alarm does not provide the best atmosphere for finding rational solutions to worrisome problems. Overdramatization serves to deflect attention from the genuine ecological issues we face and blind us to the solutions that are workable.

There are those who search for an easily identifiable villain to censure. Some in this group regard modern technology as the intruder on the naturally ordered systems that support us.

And there are some who simply yearn for a return to nature at its pastoral, unused, and untouched best.

Then, fortunately, there are people who accept the fact that there is another way out of the environmental crisis: more work and less emotion.

Environmental problems have not been invented by visionary ecologists. They are very real. To overcome them, we must seek out their origins, link these with the economic and social processes that govern how we live in the world, and learn how to change these processes so that they conform to the needs of the environment and of the people.

The extent and the complexity of our environmental problems are becoming better understood. What is being done to solve these problems may be lesser known.

For example, much of what has been happening in recent years to combat the problem of sedimentation has not made the front page or the 6 o'clock news.

Sediment is a major pollutant. It is a problem almost anywhere that soil is moved to become the silt, mud, and muck that is so destructive to water quality and so costly to remove.

Some local governments throughout the country have enacted ordinances that require builders and developers to reduce erosion on construction sites. And several states have laws providing for sediment control programs to be

carried out with the assistance of soil and water conservation districts.

To examine closely the problem of erosion and sedimentation and to encourage action by all the states, state associations of conservation districts and state soil and water conservation agencies are sponsoring a series of sediment control conferences, with help from the National Association of Conservation Districts, the U.S. Environmental Protection Agency, and others. These conferences and the need for them are very well explained in this issue of SOIL CONSERVATION by Dave Unger, the assistant executive secretary of NACD.

SCS people are well aware that local conservation districts, for more than 30 years, have been deeply involved in establishing and maintaining erosion and sediment control measures on agricultural and forest lands. Today, these same districts, which cover more than 98 percent of the privately owned lands in the nation, are also directing their attention to the soil erosion and sediment deposition resulting from rapid shifts in land uses, especially from agricultural and rural to nonagricultural and urban uses.

Dave Unger says in his article, "Slowly but surely, soil erosion is becoming illegal in this country." But practical methods for preventing erosion and controlling sediment are well known now. Let's use them.



A new look at sediment control

by David G. Unger

Assistant executive secretary

National Association of Conservation Districts

Washington, D.C.

Last summer, Governor Robert Docking of Kansas called together 150 of the state's leaders in agriculture, conservation, land development, and local, state, and federal government. The occasion was the Governor's Conference on Sediment Control—the first in a series of institutes to be held in most of the states by the end of 1973.

The purpose of these conferences is to examine anew the problem of erosion and sedimentation, explore programs underway in several states to intensify sediment control work, and encourage action by all the states. State associations of conservation districts and state soil and water conservation agencies are sponsoring the institutes, with help from the National Association of

Conservation Districts (NACD), the Environmental Protection Agency (EPA), and others.

Among the key topics of discussion at these institutes are recent federal proposals, which if enacted, would require the states to establish mandatory sediment control programs. Another is a model state act for soil erosion and sediment control in both rural and urban areas prepared by the Council of State Governments.

The decision in Kansas was to appoint a task force responsible for recommending legislative and other actions that can be taken to strengthen that state's work in this field. Similar actions are expected to result from institutes that have been held in Oklahoma, Louisiana, Oregon, West Vir-

ginia, Montana, and Minnesota and from others that will soon be held in other states.

The idea for the conferences goes back to the National Conference on Sediment Control held in 1969 in Washington, D.C., by NACD, the Soil Conservation Society of America, and the National Association of Counties. It received further impetus from educational meetings on sediment control held in Michigan, South Carolina, and North Carolina. Let's review some of the history behind the concept.

During the past decade, those of us engaged in conservation have witnessed a re-interpretation of some basic concepts. One of



David G. Unger was one of the speakers at the first conference on sediment control, which was held last summer in Salina, Kansas. Lyle Bauer, treasurer of the National Association of Conservation Districts, is seated on the left, and D. D. Holland, an SCS geologist, is on the right.

the results of this re-interpretation is that today we are concerned more directly with "sediment control" rather than "erosion control."

Back in February 1937, when President Franklin Roosevelt wrote to the governors of all the states encouraging them to support legislation to create soil conservation districts, he said:

"The dust storms and floods of the past few years have underscored the importance of programs to control soil erosion. I need not emphasize to you the seriousness of the problem . . . The nation that destroys its soil destroys itself."

Today, when we talk about sediment control, we are describing essentially the same problem, but we are approaching it from a

different direction. We are looking at it not so much from the standpoint of how the soil is washed away, but how it affects people on the way downstream and where it comes to rest.

Sediment control is not a new topic to conservation districts. It has been a principal concern of ours for 35 years. What *is* new is that today when we consider sediment control we deal with it in terms of pollution control as well as the preservation of soil as a productive resource.

Sediment has been declared the nation's greatest pollutant of our streams and lakes, by volume. The USDA Agricultural Research Service estimates that 4 billion tons of soil mate-

rials are washed into tributary streams in the United States each year. The storage capacity of manmade reservoirs in this country is being reduced at the rate of about 1 million acre-feet each year. The material being dredged annually from waterways of all kinds is estimated at three-quarters of a billion cubic yards.

What are the consequences? First, there is the irreparable loss of soil at the source, soil that has usually taken many thousands of years to form. Second, sediment and the pesticides, plant nutrients, and other materials that are carried with it pollute streams

and impair the processes of water purification and distribution. And third, sediment causes damage where it comes to rest, detracting from recreation, damaging fish and wildlife habitat, and making necessary large public expenditures for its removal.

What has been happening in recent years to deal with the problem? First, there has been action by municipal and county governments. In many places across the country, local governments have enacted ordinances requiring builders and developers to reduce erosion on construction sites in cooperation with conservation districts.

Second, the Federal Highway Administration has issued standards which require use of various erosion prevention techniques in the construction of new federal-aid highways.

And third, several states have enacted laws providing for various kinds of accelerated and intensified sediment control programs, all of them to be carried out with the assistance of soil and water conservation districts and their cooperating agencies. Maryland, South Carolina, Ohio, and Iowa have passed such laws, along with the Virgin Islands. Similar laws have been drafted and are being considered in other states including Virginia, New York, and Washington.

There are three trends exemplified in these legislative approaches. The first is that soil

and water conservation districts are given greater authority to deal with the problem. The second is that although the early laws deal primarily with construction-type erosion, the newer laws are concerned with erosion from farm and forest lands as well. And the third trend is toward an increasing degree of mandatory control in comparison to voluntary action.

Slowly but surely, soil erosion is becoming illegal in this country.

Over the years, conservation district leaders have been proud that 2 million land owners and operators have voluntarily agreed to establish conservation measures that benefit themselves and the public as well. At the same time, we've been aware that increasingly the public has asserted its right to compel those who own and manage resources to do so in a manner that minimizes harm to others and to society at large.

Sediment control, it appears, may well be the testing ground on which this issue is first confronted by soil and water conservation districts.

This is exactly what is happening.

In March 1972, the Environmental Protection Agency and the Council of State Governments prepared to develop a model state sediment control law for submission to the state legislatures.

Here is where NACD entered the picture. Our Special Committee on District Outlook had its own plans to develop model legislation in this field. We joined with EPA and the Council of State Governments in an en-

vironmental legislation symposium and hammered out a set of principles to guide the development of model legislation. We persuaded EPA that conservation districts and the state soil and water conservation agencies were by law and experience the appropriate agencies to do the job of sediment control.

Next, we helped put together a task force representing the Department of Agriculture, EPA, state governments, and the NACD to draft a model law.

The model law is premised on two basic recommendations:

"1. Responsibility for an erosion and sediment control regulatory program should be placed in the conservation districts which have the responsibility under the laws of all fifty states for the control of erosion and sediment deposition. This responsibility would be in conjunction with, but would not replace, those state and local regulatory programs concerned with the quality of soil and water resources and pollution abatement activities.

"2. Suggested state erosion and sediment control legislation should be drafted in the form of an amendment to existing conservation districts' enabling laws."

In carrying out its mandate, the task force critically reviewed each provision of the model law from the standpoint

of practicality and efficacy in achieving the desired objective of the legislation. Recognizing that any model act must be tailored by each state to comply with its constitutional and statutory requirements, the task force endeavored to set down in as clear and straightforward a manner as possible the essential requirements of an effective soil erosion and sediment control law.

Principal authorities and requirements of the model law include:

1. Establishment of a comprehensive state soil erosion and sediment control program applicable to different types of land use and soil conditions, with identification of areas having critical soil erosion and sediment problems; and adoption of statewide guidelines including conservation standards for the control of erosion and sediment resulting from land disturbing activities.

2. Establishment of district soil erosion and sediment control programs and conservation standards consistent with the state program and guidelines.

3. Prohibition of certain land disturbing activities unless conducted in accordance with approved soil erosion and sediment control plans with special requirements applicable to land disturbing activities resulting from normal agricultural and forestry activities.

4. Use of existing regulatory mechanisms, such as building, grading, and other permits applicable to land disturbing activities to implement erosion and

sediment control plan requirements.

5. Inspection, monitoring, and reporting requirements. Provision for modification of approved plans by mutual agreement.

6. Penalties, injunctions, and other enforcement provisions.

7. Provisions for cost-sharing.

8. Appropriations to carry out the act.

Dale Cochran, minority leader of the Iowa Legislature and a strong supporter of the conservation district program, presented the model law to the Council of State Governments. It was accepted unanimously and has been distributed to the state legislatures—along with other environmental legislation.

The next step is up to the conservation districts of this country. They need to decide how important sediment control is in their districts, what needs to be done about it, and whether this law—or a variation of it—is a good approach. The time is ripe for districts and state soil and water conservation agencies to exercise their authorities and responsibilities in this field.

To help explore this question in every state, NACD has secured a contract from the Environmental Protection Agency to help sponsor the sediment control institutes. These are bringing together district officials, county and municipal officers, state legislators, farm organizations, builders and developers, and representatives of state and federal agencies and organizations to discuss the problem of sediment control, the action that has been

taken in other states, and the model legislation.

All indications are that the public will demand that sediment, like other pollutants, be controlled. Regulatory programs in this field are inevitable, and this is borne out by the actions being taken in states that have legislated in this area. The questions that remain are who will carry out these programs, and how.

This complex and significant issue of sediment control is sure to dominate discussion in the soil and water conservation movement for some time to come. Its resolution should constitute one of the major developments in the history of conservation districts. ♦

Environmental concerns in conservation planning

by Charles G. Phillips

Soil conservationist

Resource Development Division, SCS

Washington, D.C.

For almost four decades, the Soil Conservation Service, working with conservation districts and others, has provided technical help in planning and implementing systems for controlling agricultural related pollutants and sediment from nonagricultural sources.

Soil erosion and sediment

Sediment, measured in terms

of total volume, is the country's largest pollutant.

It has been estimated that the Mississippi River, with an annual flow of 450 million acre-feet of water, carries nearly 400 million tons of sediment into the Gulf of Mexico every year.

Agricultural lands are large contributors of sediment, and those that are unprotected by plant cover generally are the worst offenders. Cropland is the greatest contributor. Other major

sources of sediment are land made bare by forest fires, overgrazed pasture and range land, exposed streambanks and roadbanks, highway construction areas, and construction sites in general.

Applying practices that help to control erosion is the most effi-

Environmental degradation resulting from severe sheet and gully erosion on unprotected cropland.



cient way to reduce sediment. On agricultural land, minimum tillage, mulching, crop rotation, terracing, contouring, and strip-cropping are highly effective conservation practices. Also, changing the land use on sloping land from cropland to pasture or woodland will reduce erosion.

On construction sites, sediment can be reduced by mulching, seeding, and sodding bare slopes, by minimizing soil disturbance, and by saving as many trees as is practical. Using debris basins until construction is completed and the area is stabilized and covering all critical areas, streambanks, and roadbanks with vegetation also help prevent soil loss. The vegetation should be equal to or better than the natural cover before disturbance.

Plant nutrients as pollutants

About 5 million tons of undissolved plant nutrients adsorbed by sediment particles are carried down the Mississippi River each year along with the 400 million tons of sediment. Obviously, erosion control and other soil management practices are needed to reduce this loss to the minimum.

Farmers and ranchers apply about 15 million tons of plant nutrients on their land every year. These fertilizers contain 6 million tons of nitrogen, more than 4 million tons of phosphate, and

about 4 million tons of potash. Minimum amounts of these nutrients are lost where effective soil management practices are used.

Animal wastes as pollutants

Wastes from feedlots, barnyards, and other disposal areas are often picked up by surface runoff and carried into streams and lakes. These wastes can deplete the oxygen supply in the streams and lakes and destroy fish and other aquatic life.

The waste from livestock in the United States equals that of the human population—about 2 billion tons annually. A feedlot holding 50,000 head of beef cattle can produce waste equivalent to a city of 600,000 persons. Even though all livestock waste is not a pollution hazard, runoff from feedlots must be controlled to avoid polluting streams, ponds, and lakes.

Air pollution

Air pollution has long been recognized as a problem in the urban environment. Carbon monoxide, the most common air pollutant in cities, is toxic to man and animals. In some sections of the country, air pollution is becoming a threat to agriculture. Exhaust fumes and smoke from burning coal and oil are toxic to many plants.

Dust and offensive odors are problems in both rural and urban areas. Tree windbreaks and ground cover can reduce soil blowing and dust, and the effective disposal of livestock wastes can do much to eliminate odor problems.

Noise can be considered a form of air pollution. Trees, shrubs, and grass absorb and filter some of the noise from power mowers, motorcycles, trucks, buses, farm machinery, off-road recreation vehicles, airplanes, and construction machinery.

Plants are not only the primary source of oxygen, but also they are natural air-conditioners. They absorb and filter large amounts of dust, smoke, odors, soot, pollen, and fumes. By shading the ground, they also tend to cool the air.

Planning for control of pollutants

SCS assistance in planning and implementing systems for controlling agricultural related pollutants and sediment from non-agricultural sources is provided in accordance with acceptable technical standards and meets all local and state regulatory requirements. The advice and counsel of concerned local and state agencies are solicited during the planning process.

Measures to control or reduce pollutants include controls for runoff from barnyards, feedlots, enclosed feeding barns, milking parlors, manure storage areas, and silo drainage areas; and control of erosion in heavy-use areas, on construction sites, and in other critical areas.

SCS has issued national standards for pollutant reducing practices, such as critical area planting, debris basins, disposal lagoons, diversions, heavy-use area protection, holding ponds and tanks, irrigation water management, toxic salt reduction, and

waterways. An interim standard and specification guide has been issued for "on-farm sanitary landfill." Most of the dozens of conservation practices used over the years have had a remarkable effect on controlling pollutants.

In planning systems for controlling pollutants, the agronomist, biologist, engineer, forester,

geologist, hydrologist, landscape architect, plant materials specialist, soil scientist, and range conservationist are all involved in providing the basic information needed by the soil conservationist to recommend alternative solutions to the decision maker in solving his pollution problems. Often expertise outside SCS is sought.

Planning guidelines

SCS observes the following guidelines in planning for the control of pollutants:

—Suitability of soils and topography is given high priority in locating facilities for the control

of agricultural related pollutants. —Appropriate alternative systems are considered during development of the conservation plan.

—The planned systems and components meet requirements for effective operation and maintenance and are in conformance with all applicable regulations and ordinances.

—Conservation plans provide for present and future control of pollutants.

—Surface runoff and subsurface drainage containing agricultural wastes are intercepted whenever feasible.

—The disposal site is carefully selected and located. All pertinent location information is documented in the plan.

—The conservation plan indicates the sequence of practice establishment when appropriate sequence is important.

—The land user is informed of private professional assistance available as needed.

—The land user is informed that he is responsible for obtaining all necessary permits and meeting all regulatory requirements.

Public awareness of environmental degradation provides the Soil Conservation Service and governing bodies of conservation districts with an unparalleled opportunity to give land users the technical help needed in planning and implementing pollutant controls. The seventies may be remembered not only as the time when the public became aroused about the environment, but also as the decade when SCS and conservation districts were able to achieve greater success than ever before in controlling agricultural related pollutants and nonagricultural sediment. ♦

Environmental improvement resulting from a grassed waterway and a grade-stabilization structure installed as part of a planned water-disposal and erosion-control system.



Storm water, hold it!

by Vincent J. Price
Information Division, SCS
Washington, D.C.

In Denver, Colorado, areas being redeveloped are served by a combined sanitary and storm water runoff sewer system. To prevent increased storm flows—caused by heavy urbanization—from overtaking the municipal waste disposal system and creating sanitary and drainage problems, the Denver Urban Renewal Authority requires that “all redevelopers temporarily detain storm water onsite.”

On Chicago's flat topography, drainage channels may not be able to handle storm runoff from urbanizing areas. According to the Greater Chicago Metropolitan Sanitary District, “The problem of storm-water runoff is increasing at a fast rate, and it is estimated that . . . it would cost \$192 million to rectify the deficiencies created by continual development.” Accordingly, the sanitary district now requires “storm-water detention facilities as a pre-condition to the issuance of sewer permits in unsewered and separate sewer areas.”

In Montgomery County, Maryland, rapid urbanization has increased storm-water runoff, causing severe erosion and sediment problems. A combined county-state-soil conservation district program of storm-water management has been instituted.

For most communities, onsite storm-water management is a new concept in urban conservation. Denver started in 1970. The Chicago program became effective in January 1972, and the Montgomery Soil Conservation District began its mandatory program on July 1, 1971. Each program is

unique, but all are a reply to the problems of storm-water management in an urbanizing area.

Montgomery County borders the District of Columbia and shares in metropolitan Washington's dynamic growth. The county's population has risen to 530,000, and massive development continues.

Dozens of commercial developments—shopping centers, office and apartment buildings—cover many acres of former farmland. Where grass, trees, shrubs, and forest litter have been replaced by macadam, concrete, and other nonpermeable materials, the amount of storm runoff has shot up. Lew Williams, SCS district conservationist, in referring to a major shopping center, said, “When this area was woods, less than an inch of water would run off after a storm of 3 inches; now nearly 3 inches runs off.”

In one of the county's largest shopping centers, for example, runoff water goes into a concrete outfall, then down an open channel to a half-mile of concrete conduit. The conduit then high-speeds the storm water to the point of discharge—Sligo Creek.

Peak flows at the Sligo Creek discharge point, increased by urbanization and the concrete conduit, are an estimated 6 to 8 times higher than former peak flows. Over the years, these heavy, high-speed streams of water shooting out of the concrete outfall have damaged the creek—undercutting the banks with extensive gullies, collapsing trees, widening and scouring the

streambed, and sending tons of sediment down the creek toward the Anacostia River and the Potomac River.

Because of rapid development throughout Montgomery County, what has happened to Sligo Creek is also happening to many other streams. The reason is not hard to find: while farmers and foresters try to conserve water for their crops and trees, urban landowners wish only to be rid of it.

“Rainfall on urban land is not a resource but a liability,” explained Williams, “and the developer tries to get rid of this liability as quickly as possible, generally to the detriment of the downslope and downstream property owners.”

On April 22, 1970, the Maryland Sediment Control Law was signed, requiring that “land clearing, soil movement, and construction shall be carried out in accordance with the written recommendations of . . . soil conservation districts regarding the control of erosion and siltation and the elimination of pollution.” Before building or grading permits are issued, a developer must satisfy the responsible soil conservation district that plans have been proposed to prevent undue erosion.

The Sediment Control Law was designed primarily to prevent onsite erosion and the resultant sedimentation. But, the Montgomery Soil Conservation District asked, “What about offsite erosion caused by runoff from a development? Does the 1970 law allow Maryland districts to require onsite storm-water management?”

In April of last year, the Maryland Attorney General delivered an opinion on the question, ruling that "protective storm-water measures may be imposed by the soil conservation districts."

A subcommittee of the Sediment Control Task Force, consisting of two SCS engineers, four consulting engineers, and a developer, worked through May of 1971 to come up with design criteria for storm-water management. When the criteria were agreed upon, the Montgomery Conservation District adopted onsite storm-water management as a pre-condition for plan approval of new developments. The program began in the Montgomery District on July 1, 1971.

In storm-water management, the problems are more easily identified than solved. At present there are four major types of solutions: roof storage, storage on flat areas such as parking lots and playgrounds, underground storage, and ponds. Each method shares the principle of storing the rainfall temporarily and releasing it at the rate that was normal before construction.

Storing water on flat roofs is easier than it sounds. Commercial roof ponding systems are available. One system consists of a ring built around a standard roof drain installation. A slight steady flow of water is released through the ring. A heavy rain flows over the top of the ring, preventing damage to the building.

Most roofs are already designed to support a load equal to 6 inches of water, so no structural modifications are necessary. One complaint that developers voice about roof ponding, according to Williams, is that "whenever you design for purposely storing water on a roof, roofers seem less willing to guarantee their work."

Parking lot storage is more problematic because parking lots are used space and roofs gener-

ally are vacant space. But new methods do offer promise. In Germany, for example, a perforated paving block is used to cover parking lots. This allows much of the rainfall to be absorbed into the ground.

Underground storage can be of two types: tanks or leaching pits. A leaching pit takes advantage of the permeability of soil, but there can be maintenance problems. Since there is no outlet other than infiltration, any extraneous material that gets in will tend to fill or clog the pit.

Underground storage tanks can be of any size or shape. Generally the tank has a large pipe inlet and a small outlet, with an emergency overflow piping system for extremely heavy rains. One Montgomery County developer has modified a 300-foot-long pipe to store rainwater.

Ponds for onsite storing of storm water can be either dry or wet. In a Montgomery County shopping center, an old farm pond was modified to serve as a temporary storm-water storage pond. Water enters the pond through a 66-inch pipe, but it only can leave through an 18-inch pipe. The result is a downstream flow of greater duration but of less cubic feet per second. In Montgomery Village, a residential development planned to provide housing for 15,000 people, 13 storm-water management ponds are being constructed. All 13 are wet ponds that can double as sediment basins during construction.

In the opinion of Mark Boysen, an SCS engineering specialist and a member of the team that drew up Maryland's storm-water management design criteria, "Leaching pits are questionable; underground tanks are expensive. Ponds and rooftop storage are probably best. They are inexpensive and relatively maintenance-free."

The program in Montgomery



County is still developing, and it's something of a novelty in Maryland. According to Boysen, "Onsite storm-water management is pretty well restricted to Montgomery County."

But storm-water management isn't a sudden development; rather, Boysen explained, "This program has been developing for several years. In Montgomery County there have been statements of policy relating to it for some time."

A resolution, dated February 6, 1970, by the Board of Supervisors of the Montgomery Soil Conservation District declares a policy of "encouraging and assisting in the planned management of water resources, including storm drainage, on a watershed basis." A Montgomery County Council resolution of April 1970 also speaks of "improved storm drainage management on a watershed basis."

"Right now we have only the authority to view drainage on a site-by-site basis," said Williams. "It would be sounder to take a



"When this area (left) was woods, less than an inch of water would run off after a storm of 3 inches; now nearly 3 inches runs off." And it runs into this stream (below). Increased storm flows have been undercutting the streambanks, uprooting trees, and sending tons of sediment downstream.

systems approach and consider the entire watershed as an integrated whole."

The storm-water management program, together with the rest of the Maryland sediment control program, has meant large expenditures of time and effort by officials of the Montgomery Soil Conservation District and the SCS field office that provides technical assistance. The district approves about 350 development plans a year; almost 11 hours are needed to check each plan. If the district gets backlogged, developers can't start construction, and delays can cost a major developer hundreds or thousands of dollars.

The work load of the district is heavy, but a successful program makes it all worthwhile. "I look upon this as a major and basic erosion-control program," said Lew Williams. "We're trying to help the county and the developers to mitigate the undesirable effects of urbanization on stream channels. Our objective is to preserve our streams in as near their natural state as possible." ♦



On the strip mining front: achievement in the trenches

by James Thorn
Information specialist, SCS
Morgantown, West Virginia

Dick White is a strip miner. Jim Clevenger is a conservationist.

In November 1970, they met on a farm in central West Virginia, near Weston, to work together to solve a problem. By spring, they had designed and built two large sediment-collecting ponds below one of White's strip mines to prevent soil from leaving the immediate vicinity of the mining operation.

The ponds are keeping most of the silt coming from the strip mine from entering a Public Law 566 flood-prevention lake on the same property.

The ponds actually are a result of cooperative efforts between the property owner, the mine operator, a soil conservation district, the West Virginia Department of Natural Resources, and the Soil Conservation Service.

The property owner, Simeon Hall, Jr., who is a farmer and farm-equipment dealer in the little community of Camden, sold the coal on his 335 acres to the R. N. White Contracting Co. of

Clarksburg. Dick White is president of that company.

Hall explained, "I insisted in the contract that they had to build sediment basins to protect that dam."

There had been sediment problems before on the Hall property. The same coal seams had been strip mined from 1959 to 1962, before the watershed dam was built. A small farm pond filled up with sediment. Hall said of the new sediment ponds, "That's the reason I knew they would do some good."

Hall is on the board of the West Fork Soil Conservation District. He suggested that White ask the Soil Conservation Service for design criteria for the ponds. After a series of discussions between Jim Clevenger, the SCS assistant state conservation engineer in West Virginia, and White, construction of the sediment ponds began.

The SCS soil conservation technician at Weston, Paul Alkire, stayed on the scene while White's workmen built the dams. Also present and helping was Dan McFee, the Department of

Natural Resources surface-mine inspector at Weston.

White was impressed with the engineering. "The safety factor on the dams is more than adequate," he said.

One dam, 12 feet high, is for a $\frac{3}{4}$ -acre pond. The other, 16 feet high, is for a $1\frac{1}{4}$ -acre pond. When sediment-bearing water stops behind the dams, the sediment settles to the bottom. The water flows from the top through metal pipes.

The ponds may make ripples statewide. The Soil Conservation Service has been checking on the loss of soil at the mine and the amount of sediment in the ponds for guidelines on the effectiveness of such ponds in surface mining.

White minimized erosion by prompt backfilling and seeding. He seeded grasses and legumes on the benches because Hall wanted to return the land to agricultural production.

The mine operator has limed, fertilized, and seeded according to SCS recommendations. The SCS district conservationist at Weston



The pipe (left) is being installed to allow water to flow out of a sediment-catching pond. The sediment settles at the bottom of the pond.

(Below) The two sediment ponds (the light areas in the center) were built to keep sediment washing down from the strip mining areas in the background from entering the flood-prevention dam.



said the area was probably best suited to sericea lespedeza, tall fescue, ryegrass, and sweetclover, which could be harvested for hay after 2 years of growth.

For the outer slopes, grasses and fast-growing black locust were recommended.

The ponds on the White property were the first in West Virginia built to Soil Conservation Service specifications. Since then, soil conservation districts in West Virginia have entered into a memorandum of understanding with the state's Department of Natural Resources offering this type of assistance to mine operators. SCS, through the conservation districts, provided technical assistance for the construction of 50 sediment ponds throughout the state in 1972.

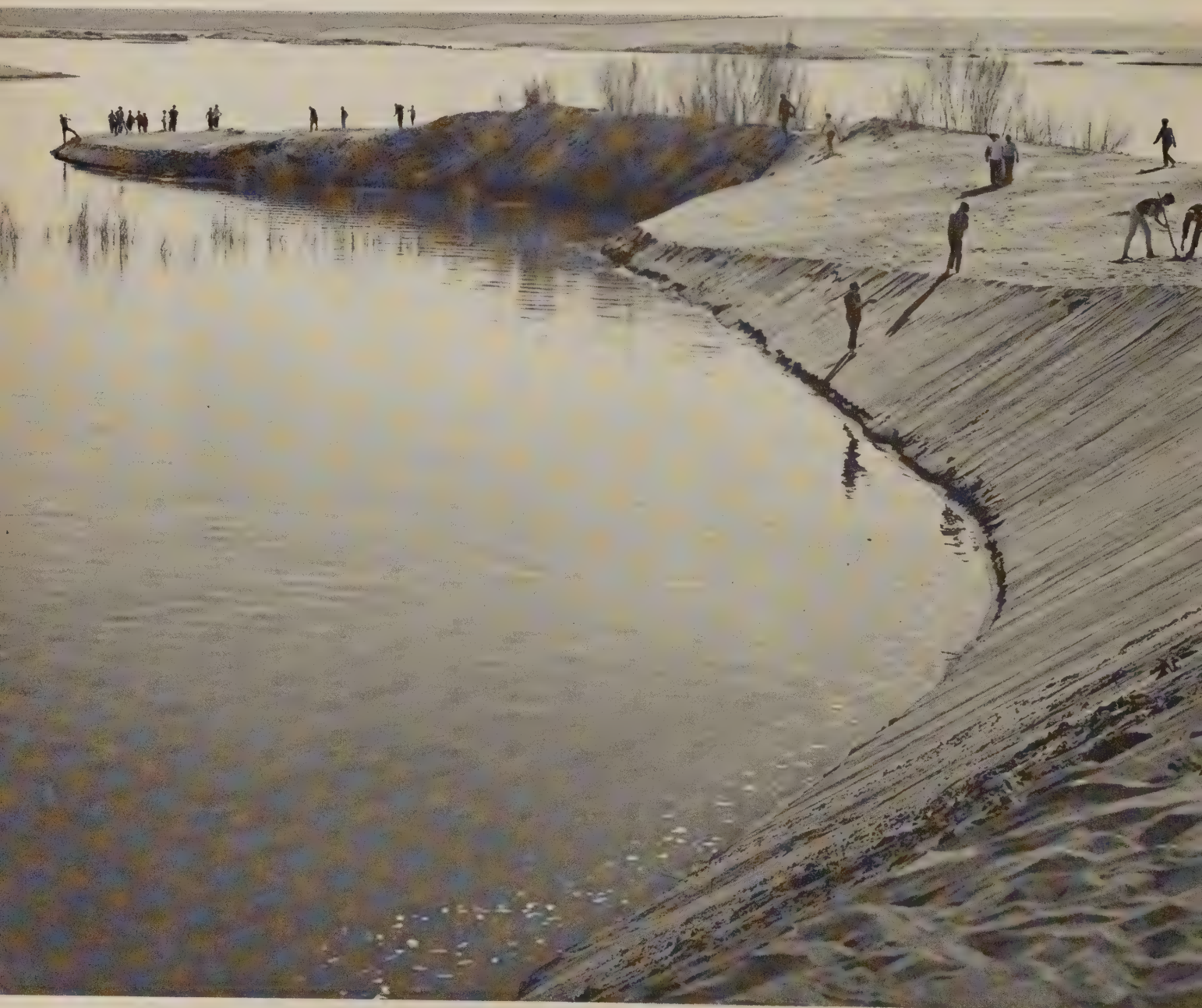
Strip miners and conservationists literally have worked together in the trenches to build the ponds. A lot of pride—in mining coal, in conserving basic resources—has had to be accommodated. And conservationists and strip miners have learned more about the problems involved. ♦

In a 7-year period (1965-1971) approximately 10,000 land-owners and mine operators in conservation districts in the United States reclaimed 338,000 acres of surface-mined land. This work has significantly reduced soil erosion, sedimentation, and acid pollution of streams from the mine sites.

Much more work needs to be done. The latest figures indicate that more than 4 million acres have been disturbed to date in surface mining to harvest coal, sand and gravel, and about 40 other commodities.


About 90 percent of this land is privately owned and is intermingled with farm, ranch, forest, and other land in rural and suburban areas—on which SCS already is giving conservation help.

BOY POWER



in conservation

by Laurence A. Arpin
District conservationist, SCS
Moses Lake, Washington



In the late 1940's, the U.S. Bureau of Reclamation turned a bleak sand dune area in the heart of Washington's Columbia Basin into a paradise.

In more recent years, "boy power"—and some "girl power"—has been saving this paradise and transforming the diminishing islands in the inundated area into protected bits of wildlife sanctuary and recreational playground.

The Bureau of Reclamation constructed a 3½-mile-long dam there in the 1940's. The structure, called the O'Sullivan Dam, was built primarily to store water for irrigation downstream. The 37,000-acre reservoir is called the Potholes Reservoir. Not all of the reservoir area is covered by water. Several hundred small islands, ranging in size from a few square feet to several acres, dot the water. These small islands, generally bare of protective vegetation, were virtually disappearing. Wind erosion and wave action were wearing them down and

moving the sand out into the deeper water.

Realizing the fate of the many islands, representatives of the Washington Game Department, Boy Scouts of America, Bureau of Reclamation, and Soil Conservation Service got their heads together and came up with a possible solution. Their plan was to use the several hundred Boy Scouts and Girl Scouts in the Columbia Basin District who had been looking for conservation projects to work on.

Saving the Potholes islands turned out to be more than a conservation project. It was a challenge offering the youths an opportunity to direct their energies to public service that would help wildlife and bring about recreational benefits that they and others could enjoy in the years to come.

In 1968, a conservation camporee was held at the Potholes Reservoir; all Boy Scout troops in the Columbia Basin District were invited. With 408 Scouts and 41 adult leaders on the scene, the project began. Boats shuttled boys, men, and materials to scattered islands. Large quantities of selected species of grass seed had been made available by the Soil Conservation Service's Plant Materials Center at Pullman for test on this project. Tree cuttings and seed of special native grasses were collected by the boys. Other

This island is typical of the several hundred small islands in the Potholes Reservoir that were gradually vanishing into the water because of wind and water erosion. Since 1968, the Boy Scouts of America, by planting grass, trees, and shrubs, have been helping to save the islands.



Wally Morris, of the SCS field office in Moses Lake, shows a group of Scouts how to collect seed from old established stands of Volga wildrye for planting on the islands.

materials and equipment such as bales of straw, trucks, and boats were donated by Scout leaders and private citizens.

A second camporee for 365 boys and 31 adult leaders was held in 1969, and another one in 1970 brought 260 boys and 30 adults to the islands.

"Boy power" at the three conservation camporees planted 40,000 clones and 250 pounds of 'Volga' wildrye, 600 pounds of thickspike wheatgrass, 80 pounds of Indian ricegrass, 300 pounds of tall wheatgrass, 15,000 to 16,000 willow cuttings, and 10,000 Lombardy poplar cuttings. The Indian ricegrass and Volga wildrye seed and the clones were collected by the boys from established stands in other areas. The boys also made the poplar and willow cuttings.

In April 1971, Girl Scouts in the Moses Lake area joined the

save-the-islands movement and held a 1-day conservation camp-out. The girls planted 2,000 small tree seedlings and 1,000 clones of Volga wildrye.

Vegetating and preserving these islands have made a great contribution to wildlife, fishing, picnicking, boating, and water sports in the area. Each island is a potential wildlife sanctuary ideal for family outings or ecology study. The Potholes Reservoir has been turned into one of the most attractive spots in the Pacific Northwest. ♦

Rural Louisiana is cleaning up its streams and countryside. More and more towns and parishes are taking giant steps to put garbage underground and sewage and animal waste in pits.

Mayor Edwin Preis of Newellton makes no bones about it: "That sewage lagoon below town is the best thing that's happened around here in years."

H. M. Fowler, a former mayor of Coushatta, feels the same way about Coushatta's sewage lagoon system.

Charles McDaniel, looking out over his dairy herd in Tangipahoa Parish, said, "This animal-waste lagoon system saves me money and, at the same time, keeps waste from polluting streams."

And up in DeSoto Parish, Police Juryman Albert Reeves said, "Cans and garbage look better in a sanitary landfill than along the roadside."

No more septic tanks

Newellton is a Tensas Parish town with a little over 1,400 people. The way Mayor Preis tells it, septic tanks were no longer satisfactory. "The soil was poorly suited for septic tanks to begin with. There were so many in town that the soil could not soak up all of the effluent, and so it came to the surface—especially when it rained. The smell was pretty bad; we had to do something."

The Newellton sewage lagoon system is about 2 miles from

Treat your waste right

by Gene Warren

Public information specialist, SCS
Alexandria, Louisiana

town and covers about 20 acres. The town's sewage flows into the lagoon through pipes, and bacteria breaks down the solids. An almost clear liquid flows from an outlet pipe into a ditch. "Experts say the liquid is pollutant free and does no harm to fish," commented the mayor.

Preis said the Newellton system cost about half a million dollars. "We couldn't have financed the project if the Farmers Home Administration hadn't given us a long-term low interest loan. Also, the Agriculture Stabilization and Conservation Service cost-shared with a little more

than \$2,200 as part of its Green-span Program, and the Soil Conservation Service helped with soil and seeding recommendations. All in all, we had lots of help, and the town is grateful."

Sewage lagoons need to be built right and located in the proper place. The Louisiana

The population growth expected within the next 10 to 15 years was a factor considered in designing this 30-acre sewage lagoon for Rayville, Louisiana, whose present population is a bit under 5,000. Billy McGlothlin, superintendent of Rayville's water department, is on the left, and Hugh Tidwell, SCS district conservationist, is on the right.

"It's perfectly clear." Lon Cloniger, on the right, a past mayor of Rayville, and Tidwell inspect the discharge point of the sewage lagoon.



State Board of Health has drawn up specifications for sewage lagoons as well as for animal-waste lagoons. Private engineering firms usually design and supervise construction of sewage lagoons. The Soil Conservation Service provides technical help in building animal-waste systems and is called on for soil maps and interpretations to help locate sites for both types of systems. Couchatta is a good example of this.

The system there was completed in 1970. But before it was started the mayor called on the local SCS office for information about soils. Soils of clay or clay loam texture are best for sewage lagoons because they hold water.

Soil surveys were used to locate these soils.

"Before we put in our system our sewage was going into the Red River," said Fowler, who was mayor at the time. "Now it's trapped in the lagoon. On top of that, this system cost us about one-tenth of what a treatment plant costs."

Low maintenance cost is a big factor in sewage lagoons. Raymond Granelle, with the health unit at Rayville, said that the 30-acre lagoon serving that town needs just an occasional check on the water level, and the grass on the levees has to be mowed. Rayville's system, like most others, is designed to take care of the population growth within the next 10 to 15 years.

The rivers run clean

Tons of animal waste that once flowed into Louisiana's streams and lakes each day are now going into sewage lagoons. More

than 150 animal-waste systems have been built in the state by dairymen.

Charles McDaniel of Wilmer was one of the first to complete his lagoons. He said that before he built his waste system all the manure was shoveled and loaded at the barn and hauled to pastures. "Lots of it washed into streams and so did most of the waste that washed out of the barns. Now, it goes right into the lagoons," said McDaniel, a long-time cooperater with the Bogue Chitto-Pearl River Soil and Water Conservation District. He asked for help from SCS in finding a suitable site for his lagoons and in designing their layout.

Underground garbage disposal

Many people don't have places to dump trash, so they put it on the road or on somebody's land. Many police juries are doing something about this problem. DeSoto Parish residents, for example, have access to seven sanitary landfills. Police Juryman Albert Reeves said the big advantage of landfills is that when full they can be covered and the land can be put to another use.

SCS is helping parishes throughout the state to locate suitable sites for landfills. Good drainage is important. One end of the trench has to be open so water can drain out. The soil has to be right so banks won't slough.

In Louisiana it's perfectly clear that rural people want to do their bit to clean up the countryside and to keep animal and human wastes out of their lakes and streams. Now that's a good sign. ♦

Animal waste from this dairy barn is washed into a drainageway that carries it into the lagoon system in the background.



Help yourself

There was a time in Kemmerer, Wyoming, when the drinking water took on a “different” taste right after a storm. And esthetically the town wasn’t any better off. People approaching Kemmerer from one end of town were greeted by an open garbage dump, and from the other end by a rundown cemetery.

Then, in 1968, things began to happen. People in Lincoln and Uinta Counties organized the Western Wyoming Resource Conservation and Development Project to help in the development of urban and agricultural areas in the two counties.

RC&D projects are locally initiated and directed, permitting local people to work together for mutual goals. The Soil Conservation Service has U.S. Department of Agriculture leadership in providing assistance to sponsors of RC&D projects.

Soon after the Western Wyoming RC&D Project was organized, Kemmerer officials asked the project’s executive committee for help in developing a sanitary landfill and in improving the town’s cemetery. The committee approved the request.

Today the town’s cemetery is no longer an eyesore, and a landfill has replaced the old dump, which has been covered with soil and allowed to go back to native vegetation.

With the support of the RC&D committee, Kemmerer obtained a grant from the Department of Housing and Urban Development for the design and installation of a new water supply system.

The people of Kemmerer know that RC&D projects promote the concept of “self-help,” and that’s what they have done. ♦

by Richard L. Thompson
RC&D project coordinator, SCS
Kemmerer, Wyoming



Kemmerer, Wyoming, has a sanitary landfill . . .



a new water treatment plant . . .



and a sprinkler system for its cemetery—all because of an RC&D project.

Review

Audiovisuals

The Effects of Air Pollution on Plant Life. 1972. USDA, Office of Communication, Photography Division. Slide set A-48. \$18.50. This new slide series illustrates damage done to vegetables and fruits, field crops, and ornamental plants and trees by pollutants in the air. Some slides compare plants grown in filtered air to those grown in normal air. Others show closeups of leaves and fruit suffering oxidant or other injury. The set of 105 slides is broken into three subsets which can be purchased individually for \$13. The subsets are: A-48-A, "Vegetables and Fruits," A-48-B, "Field Crops," and A-48-C, "Ornamental Plants and Trees." A narrative guide accompanies each set or subset.

New publications

Erosion and Sediment Control Handbook. 1971. Cumberland, Dauphin, and Perry Soil and Water Conservation Districts (Pennsylvania) in cooperation with the Soil Conservation Service. 75 pp., illus. The primary purpose of this handbook is to help municipal officials develop and administer erosion and sediment control programs in urbanizing areas. It explains tried and proved ways to control erosion and reduce sediment. Specifically it gives guidelines, standards and specifications, definitions, and sample materials for use by planning commissions, township supervisors, borough officials, developers, contractors, and others. Some of the practices recommended in the report are grass and legume covers, sodding, mulching, and drainage, and constructing grassed waterways, grade stabilization structures, temporary and permanent diversions, and debris basins. The ap-

pendix includes models for resolutions amending land subdivision regulations and for ordinances for erosion and sediment control.

Rural Development, Part 1. Information and Technical Assistance Delivered by the Department of Agriculture in Fiscal Year 1972. 71 pp. In this third annual report to the Congress, USDA states that its employees and those of the State Cooperative Extension Service devoted 34 percent more time to rural development activities in Fy '72 than in Fy '71 and helped local leaders organize more than 150 new rural development committees. Some 51 new area or multicounty rural development committees were formed, bringing the number of area committees in the nation to 235, and more than 100 new county committees were formed, pushing the national total to 2,193.

Rural Development, Part 2. Financial and Technical Assistance Provided by the Departments of Agriculture and Housing and Urban Development for Nonmetropolitan Planning Districts in Fiscal Year 1972. [82] pp. HUD, in Fy '72, doubled state funding for comprehensive planning, and USDA and cooperating state agencies increased technical assistance for nonmetropolitan planning districts, developed closer relationships with state agencies responsible for planning administration, and put more emphasis in their own programs on development priorities set by multicounty agencies in some areas.

Asphalt Linings for Seepage Control: Evaluation of Effectiveness and Durability of Three Types of Linings. By C. W. Lauritzen and A. R. Dedrick. 1972. USDA Tech. Bull. 1440. 61 pp., illus. \$0.35. In

1945 an outdoor seepage laboratory was constructed on Logan River, Logan, Utah, to obtain more accurate information on the performance of canal and reservoir linings. Included were four seepage channels, each divided into eight 20-foot-long sections. Fourteen of these 32 available test sections were used for the asphalt lining studies. This bulletin summarizes the test findings of the studies.

Geological Survey Research 1972, Chapter B. 1972. U.S. Department of the Interior, Geological Survey Professional Paper 800-B. 281 pp., illus. \$2.25. Chapter B is a collection of 39 short papers reporting on scientific and economic results of current work by the U.S. Geological Survey on analytical methods, astrogeology, economic geology, geochemistry, geophysics, glacial geology, ground water, hydrologic techniques, isotope hydrology, marine geology, paleontology and stratigraphy, petrology and mineralogy, remote sensing, structural geology, surface water, and urban hydrology. Chapter A will be published later.

Growing Ornamental Plants in Containers: A Handbook for the Nurseryman. John J. McGuire. 1972. Univ. of Rhode Island, Cooperative Extension Service (Kings-ton) Bull. 197. 39 pp., illus. This handbook gives a thorough treatment to the subject, discussing everything from container types to packaging and marketing. The information is based on research conducted in the past 10 years and applies specifically to the Northeast. The principles of growing container plants, however, are universally applicable. The plants grown in containers in various phases of the research are listed in the appendix.

Seed Crops, Revised Estimates, 1964-69. 1972. *USDA Statistical Bull.* 499. 29 pp. Presents the revised estimates of acres harvested, yield per acre, production, season average price received by growers, and value of production, by states, for 17 kinds, varieties, and species of seed crops. Also included are U.S. totals of carryover, imports, total supply, total disappearance, and exports for seeds estimated.

A History of Federal Water Resources Programs, 1800-1960. By Beatrice Hort Holmes. 1972. *USDA Misc. Pub.* 1233. 51 pp., illus. Discusses most of the significant federal water resources legislation up to 1960 and describes the programs of U.S. planning and construction agencies; the extent of federal river basin planning and development up to 1960; and the beginning of federal encouragement of and cooperation with state and local planning.

Facts About Resource Conservation and Development Projects. 1972. *USDA SCS-CI-14.* [4] pp. Explains the purpose and outlines the procedure for starting a resource conservation and development project.

Soil survey

Woodbury County, Iowa. By John R. Worster, Elmer H. Harvey, and Laurence T. Hanson. 1972. *Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station.* 87 pp., illus.; maps 4 inches to the mile (1:15,840).

Pope County, Minnesota. By Raymond T. Diedrick. 1972. *Soil Conservation Service in cooperation with University of Minnesota Agricultural Experiment Station.* 109 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Pinellas County, Florida. By Earl S. Vanatta, Jr., Leon T. Stem, William H. Wittstruck, David E. Pettry, and James W. Spieth. 1972. *Soil Conservation Service in cooperation with University of Florida Agricultural Experiment Stations.* 64 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Montgomery County, Texas. By W. R. McClintock, Jr., T. L. Galloway, B. R. Stringer, and L. E. Andrew. 1972. *Soil Conservation Service and Forest Service in cooperation with Texas Agricultural Experiment Station.* 70 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Meetings

February

- 18-21 Sprinkler Irrigation, Technical Conference, Dallas, Tex.
- 20-22 National Agricultural Outlook Conference, Washington, D.C.
- 20-23 Southern Forest Institute, Atlanta, Ga.
- 21-23 Family Camping Federation, Nettles Island, Stuart, Fla.
- 24-28 American Association of School Administrators, Atlantic City, N.J.
- 25-28 National Association of Regional Councils, Minneapolis, Minn.
- 28-Mar. 2 Land Improvement Contractors of America, New Orleans, La.

March

- 2-4 International Geobotanical Conference, Knoxville, Tenn.
- 3-6 Hardwood Plywood Manufacturers Association, Disneyworld, Orlando, Fla.
- 3-6 American Camping Association, Philadelphia, Pa.
- 9-15 Associated General Contractors of America, San Francisco, Calif.
- 11-14 Farmers Union, Omaha, Nebr.
- 11-16 American Society of Photogrammetry, Washington, D.C.
- 11-17 National Wildlife Week.
- 16-18 National Wildlife Federation, Washington, D.C.
- 17-28 American Association of School Administrators, San Francisco, Calif.
- 18-21 The Wildlife Society, Washington, D.C.
- 18-21 North American Wildlife and National Resource Conference, Washington, D.C.
- 18-21 Association for Supervision and Curriculum Development, Minneapolis, Minn.
- 25-27 National Recreation and Parks Association, Southern Region, Memphis, Tenn.
- 28-30 National Conservation Tillage Conference, Soil Conservation Society of America, American Society of Agronomy, American Society of Agricultural Engineers, and National Association of Conservation Districts, Des Moines, Iowa
- 30-Apr. 3 National Science Teachers Association, Detroit, Mich.

April

- 1-5 American Concrete Pipe Association, Washington, D.C.
- 1-5 American Road Builders Association, Houston, Tex.
- 2-6 American Pulpwood Association, Atlanta, Ga.
- 4-6 Water Resources Congress, Washington, D.C.
- 7-12 National Planning Conference, Los Angeles, Calif.
- 8-13 Association for Educational Communication and Technology, Las Vegas, Nev.
- 9-11 National Water Safety Congress, Tulsa, Okla.
- 9-15 Earth Week.
- 15-18 Association of American Geographers, Atlanta, Ga.
- 16-20 American Geophysical Union, Washington, D.C.
- 16-20 Western Snow Conference, Grand Junction, Colo.
- 23-25 National Academy of Sciences, Washington, D.C.



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Recon . . .

Wild duck chase. Wisconsin has not always been one of the leading wild-game states in the nation. The September 7, 1905, edition of *The Iola Herald* reported: "Two hundred and fifty hunting licenses were issued by county clerk Shoemaker before September 1, the opening day of the hunting season. What the hunters around here want to shoot is a mystery to us. You may go out into the woods, tramp around all day, and if you see more than a lone red squirrel or a blue jay, you are lucky. It is said that if there is one wild duck in the neighborhood, and as soon as it can be located, a regiment of hunters will be sent after it. Hunting for game in this country is a thing of the past."

Figures for 1972 were not available at presstime, but in 1971, Wisconsin issued 805,824 hunting licenses (including resident, nonresident, archer, junior archer, small game, and large game).—Ed.

Humanizing the earth. "Just as nature has not been capable by itself of giving full expression to its potential diversity, likewise it is not capable of maintaining manmade environments in a healthy state. Now that so much of the world has been humanized,

environmental health depends to a very large extent on human care. Swampy areas must continually be drained, forests must be managed, the productivity of farmlands must be maintained by crop rotation, irrigation, fertilization, and destruction of weeds. . . . Man can create artificial environments from the wilderness and manage them in such a manner that they long remain ecologically stable, economically profitable, esthetically rewarding, and suited to his physical and mental health . . ."—Rene Jules Dubos, professor emeritus, Rockefeller University, New York City, speaking to the American Association for the Advancement of Science in December 1972.

What a whey to go! Although curds and whey may have been a delight to Little Miss Muffet, most of us have never seen these byproducts of cheese-making, much less eaten them. That situation soon may change, according to Dr. Joseph F. Mattick, professor of dairy science at the University of Maryland in College Park. For several years, dairy scientists at the university have been engaged in research on utilizing fluid acid whey, the byproduct of cottage cheese proc-

essing. So far, they have been able to successfully produce jams, jellies, sweetened fruit-flavored drinks, cocktail mixers, ice cream, and sherbets using whey as a base. Work is currently in progress on perfecting a whey wine.

And where does it go? One acre of cultivated land averages 12 tons of erosion every year, and 1 acre of land exposed during construction can average 250 tons of erosion every year, according to the Agricultural Experiment Station, The Pennsylvania State University.

City life continues to lose its appeal for many Americans. Only 13 percent of persons interviewed in a recent survey (Gallup Poll) said they would prefer to live in a city rather than a nonurban area; 23 percent picked a farm as the ideal place to live, and 32 percent picked a small town. This contrasts with a 1966 Gallup Poll in which 22 percent of respondents stated a preference for city life. These changing attitudes are of significance to city planners, urban developers, and others who must make long-range decisions based on projected population movement.



U. S. Department of Agriculture/Soil Conservation Service/February 1973

Achievement, 1972

SCS Annual Report

S OIL CONSERVATION

this month presents a review of SCS accomplishments during fiscal year 1972. It was truly a year of achievement. The facts and figures are strong evidence that SCS people across the nation did not let up in the tremendous task of safeguarding our soil and water resources. As Dr. Hugh Hammond Bennett, the first chief of the Soil Conservation Service, said 27 years ago, "The day will come when the combination of productive land and water will rank second only to people as the most important of all resources. Meanwhile, conservationists must carry on unflinching in their efforts to stop erosion."

- 139 Achievement, 1972
Summary of activities of the Soil Conservation Service
- 147 Guidelines for tomorrow
by Vincent J. Price
- 150 For conservation's sake—and retirement
by Albert Howard
- 152 Fun—far from the crowds
by Edgar Baumann
- 154 Cover for bare ski slopes
by James A. Weston
- 156 So you want to live in the country
by William R. Hauck
- 158 Recon
- 159 Review
- 159 Meetings
- 160 From the Administrator
Beyond figures

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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Achievement, 1972

Summary of activities of the Soil Conservation Service for fiscal year 1972

"... only a few years ago there was so little interest in this subject [soil conservation] over most of the country that I never dreamed I would live to see the progress that's been made today."

Dr. Hugh Hammond Bennett, first chief of the Soil Conservation Service, spoke those words 27 years ago. Progress since then has been considerable, and interest in conservation continues to rise.

In 1972, 34 million acres of land were adequately treated from a conservation standpoint. A few SCS-assisted conservation and environmental practices reported during the year include:

43,180 acres of farmstead and feedlot windbreaks planted.

398,443 acres of trees planted—in addition to windbreaks.

107,670 feet of fish stream improvement work.

2.3 million acres in minimum tillage.

10.9 million acres in improved pasture and hayland management.

53,339 ponds built.

51,995 acres of recreation area improved.

250 miles of streambank protection work done.

7.5 million acres of wildlife habitat management.

365,823 acres of woodland improvement.

19.3 million acres of crop residue management.

Resource technology development

In fiscal year 1972, SCS continued to refine its resource

technology to meet challenges posed by the intensified use of soil, water, and related resources and by the impact of technology on environmental quality.

Agricultural waste management

Progress was made in developing and installing systems to recycle agricultural wastes. The techniques and practices used are aimed at incorporating the waste material into the soil and the utilization of nutrients in the wastes by plants.

About 5,100 systems involving lagoons, holding ponds or tanks, and irrigation or spreading systems are now installed and operating. These are very much a part of a conservation system. They not only help protect the

environment by keeping wastes out of lakes and streams, but also they help make rural areas a better place in which to live and work.

SCS is increasingly being called on by communities and their consultants for inventory and evaluation assistance in developing systems for recycling to the land the effluents and sludges from sewage treatment plants.

Soil data

A faster and more accurate method of recording resource data has been developed. Data reflecting the soil scientist's experience and research on the behavior of a given kind of soil are systematically coded and placed into the computer. These data can be retrieved quickly and used to show the suitability or limitations of the soil for various uses. Many other kinds of data important in planning and in making resource inventories also can be obtained. This method already has had extensive application, notably in the study of river basin areas.

A field test kit that allows soil scientists to perform onsite many analyses needed for the classification of soils also was developed. The kit, now being manufactured by a commercial firm, is part of the continuing SCS effort to improve the quality of soil surveys.

Plant materials

During the past year, the following new plants from SCS Plant Materials Centers passed field tests and were released jointly by SCS and cooperating state experiment stations and other federal agencies for commercial production:

- 'Cave-In-Rock' switchgrass, for warm-season forage, wildlife cover, and critical area stabilization in the Corn Belt.
- 'Rosana' western wheatgrass, an improved variety

for forage and erosion control in Montana and Wyoming.

- 'Palar' Wilman lovegrass, for forage and cover on the desert grasslands of Arizona.
- 'Mackinaw' birdsfoot trefoil, an improved forage legume for the upper Corn Belt and Great Lakes areas.
- 'Lathco' flatpea, for erosion control, beautification, and wildlife cover on highway banks, mine spoil areas, and shaded roads in woodlands in the East.
- 'Emerald Sea' shore juniper, for stabilization and beautification on coastal sand dunes and inland sandy areas.

Many of these new plants should have a dramatic impact in their area of use and adaptation within just a few years. Plant materials are a major part of any soil erosion and sediment control program.

Surveying and monitoring

SCS intensified its emphasis on surveying and monitoring work as a major tool in improving the quality of living in rural and suburban communities.

Soil surveys

One major effort has been to accelerate the publication of soil surveys. Last fiscal year, 80 soil surveys were completed and sent to the printer—the greatest number ever in one year and twice the number submitted in fiscal year 1970. The 80 surveys represented about 42 million acres of mapped land. As of the end of fiscal year 1972, about 43 percent (815.3 million acres) of the land planned to be surveyed in the United States had been surveyed.

In addition, in fiscal year 1972, 449 special soil interpretation reports were prepared and made available for local use. These re-

ports are published prior to the completed soil survey and represent an immediate response to requests from communities for basic soil information for land use planning. For example, a town may request a soil interpretation report for use in determining the suitability of sites for schools, housing, or sanitary landfills.

Soil surveys are vital in making sound land use decisions. In-depth discussions on land use problems and policies are in progress in virtually every state, and soil interpretations are increasingly recognized as a necessary part of land use planning. There is a growing awareness that any land use, whether for housing, crops, recreation, wildlife, or other purposes, must take into account the potentials of the soil. Soil surveys prepared by SCS and its cooperators are rapidly gaining recognition as one basis for developing local, state, and federal land use policies.

A book, *Soil Taxonomy*, describing the most modern system of soil classification, was completed in 1972 and sent to the printer.

Resource conservation assistance

The year 1972 probably saw an increased awareness on the part of government, governmental leaders, and the public of the seriousness, enormity, and costliness of public and private policies that allow soil erosion and sediment deposition to remain a critical threat to our resource base, the environment, and the quality of life.

SCS has been a leader for 37 years in carrying out a nationwide program to control erosion. During the first 25 years it seemed that mostly farmers understood the problem. But interest has grown, and today not only farmers but also doctors, engineers, law-

yers, businessmen, and other people have become leaders of conservation districts.

Today the causes of accelerated soil erosion and sediment damage are understood far and wide. And the technical assistance that SCS provides goes far beyond anything ever envisioned years ago by Hugh Bennett.

Help through conservation districts

During fiscal year 1972, the Soil Conservation Service continued its planning assistance to individual land owners and users and groups cooperating with the 3,024 conservation districts throughout the country. SCS has increased help to groups and organizations ranging from two or three land owners to many land owners.

SCS people helped prepare more than 71,000 conservation plans covering nearly 27 million acres and helped revise 29,570 plans covering 19.7 million acres. More than 594 million acres of nonfederal land in the United States now are covered by conservation plans that insure resource protection and proper land use.

Conservation districts, by the end of fiscal year 1972, had more than 2.2 million cooperators who were applying and maintaining soil and water conservation practices on 775.3 million acres.

SCS recognizes that conservation measures must be carefully planned, installed, and maintained. SCS provides onsite technical assistance for applying measures if needed to insure quality control and to implement new techniques. In fiscal year 1972, SCS provided 2.9 million technical services to 1.1 million individual land owners and users in conservation districts.

Wildlife. SCS environmental improvement work for wildlife was impressive in fiscal year 1972. SCS specialists helped land owners

across the country improve more than 7.5 million acres of land and water for the specific benefit of wildlife—a 28 percent increase over 1971. In addition, strip-cropping, range improvement, pond building (53,000 in 1972), and other wildlife-benefiting practices were put on millions of acres of land.

More than half a million acres of land were converted to wildlife-recreation in 1972, bringing the total to date to more than 13 million acres.

Conservation help for units of government

As the report by the Council on Environmental Quality stated, "A quiet revolution is going on throughout the nation." Public awareness is causing local and state governments to become more active in environment improvement programs.

As a result of public concern, many local governments have enacted ordinances that require conservation principles to be incorporated into development plans. Such plans take into account the suitabilities and hazards inherent in the soils.

SCS has helped many local and state governments by giving them resource information and guiding them in its use to prepare programs and plans for making communities, villages, towns, counties, and states a better place to live and work.

In fiscal year 1972, SCS provided more than 100,000 technical services to 26,627 local and state governments and their agencies. That's an increase of 31.6 percent over 1971. About 530 local ordinances concerned with land use and erosion and sediment control have been put into effect by local governments.

More than 15,500 natural resource inventories and evaluations were prepared with SCS help, for a 42 percent increase

over 1971. With such information local units of governments can develop quality standards for conservation land use and treatment.

In addition, SCS helped more than 2,400 public facilities, such as schools, find sites on suitable soils and topography. This assistance jumped 19.6 percent over 1971.

Watershed projects

Continued interest in Public Law 566 small watershed projects during fiscal year 1972 was reflected in the more than \$66 million obligated for construction of multipurpose dams, flood-water-retarding structures, and other water management measures. An additional \$11 million was obligated for structures in the 11 flood prevention projects authorized under an earlier act.

Hurricane Agnes, in June 1972, dramatically illustrated the effectiveness of the small watershed program. One hundred and sixty-one floodwater-retarding dams and 150 miles of channel work, costing \$38 million, prevented an estimated \$22.2 million in direct damages from this one storm. Every dam built with SCS assistance held. The structures suffered little damage and are ready to repeat their planned flood prevention function when needed.

In Pennsylvania, where all 67 counties were declared eligible for federal disaster aid following Hurricane Agnes, seven small watershed projects had been completed and 14 were under construction. Local officials of the town of Jim Thorpe, in Carbon County, estimated that a quarter of a million dollars in damages were prevented by the Mauch Chunk Watershed Project.

And in Virginia, it was reported that dams built through the Mountain Run Watershed Project in Culpeper County held back 1.8 billion gallons of water during the hurricane. Unlike the

Estimates of benefits gained in 1972 and since the PL-566 watershed program began.

1972	Total
\$48 million in flood damages prevented	\$270 million
1.8 million tons of sediment trapped	16.6 million
\$56 million in benefits from erosion control and grassland improvement	\$347 million
3,050 man-years of employment from construction . .	22,600
7,000 new jobs created in new and expanded businesses	almost 70,000
9 reservoirs for municipal and industrial water supply . . . a total of 75 reservoirs serving 364,000 people in 76 towns.	
16 reservoirs with recreation facilities, providing 1.1 million annual user days	101 reservoirs providing a total of more than 6 million user days.

nearby communities of Rapidan and Remington, which were inundated by floodwaters, the town of Culpeper received only minor damage from flooding.

Originally designed to help control soil erosion, reduce sediment, and prevent floods, the watershed program has been expanded in recent years to provide water supply, recreation, fish and wildlife, and other positive community benefits. Watershed projects also bring new jobs to rural towns.

During fiscal year 1972, federal assistance in planning, preconstruction, or construction work was furnished to sponsors of 998 watershed projects. Initial agreements for construction were signed for 50 projects in 32 states. Sponsors of 361 projects had completed the construction of all engineering measures, and 333 of these projects have now completed all planned construction and related land-treatment work.

Local sponsors submitted 42 new applications for assistance during the fiscal year. Planning assistance was authorized for a total of 1,662 projects by the end of the year, leaving a backlog of 1,273 unserved applications.

At year's end, a total of 1,060

projects had been approved for USDA assistance, with 49 plans awaiting administrative or Congressional approval.

River basin planning. The broad objectives of river basin planning correspond closely with those outlined in the SCS Framework Plan. River basin planning aims at meeting present and future needs and wants of the people by helping in the conservation, development, and productive use of the nation's natural resources.

River basin studies are increasingly incorporating environmental considerations and impacts. Environmental assessments are now a required part of all types of river basin surveys. Environmental quality is a major objective in the latest cooperative surveys, along with the objectives of national and regional economic development and social well-being. This is a recent giant step toward multiple-objective planning which is aimed at presenting to decision makers a complete and clear picture of alternative plans and effects.

Agencies of the U.S. Department of Agriculture—the Soil Conservation Service, Forest Service, and Economic Research Service—have participated in about 116 river basin studies in

every state except Alaska, covering more than 80 percent of the nation's area. In 1972, 10 studies were initiated, and 9 were completed.

USDA agencies have participated in three types of investigations and surveys that differ in degree of intensity and level of coordination. A *comprehensive framework survey* in the major water resource regions is the first and broadest level of planning. This type of survey is carried out jointly by the concerned federal departments and the involved states and is coordinated at the federal level by the Water Resources Council. Twelve such surveys have been initiated; 8 essentially have been completed.

A *comprehensive detailed survey* is a more intensive study than a comprehensive framework survey. Twenty-two of these have been funded, including the Hawaii Regional Study and the Connecticut River Supplemental Study, and 15 have been completed.

The third type of study is the *cooperative survey* carried out by states and concerned federal agencies. These surveys are coordinated at the state level and, in most cases, are as detailed as comprehensive detailed surveys. Since 1960, USDA has participated in 82 cooperative surveys and has completed 26. Eight studies were initiated last year.

A recent bill has been introduced in the U.S. Congress for implementing the Lower Rio Grande Basin Plan; a River Basin Authority for implementing the Chickasaw River Basin Plan in Memphis, Tennessee, has been established; and multicounty environmental corridors in the Southern Minnesota River Basin have been established.

Flood hazard studies. In fiscal year 1972, SCS continued to provide technical data and assistance to states and local governments in identifying flood hazard areas and

in preparing flood plain management programs.

States and local governments are increasingly realizing the necessity for stringent controls on flood prone areas. SCS assists them by carrying out flood hazard analyses and related flood plain studies.

Widespread need for flood hazard information has accelerated the demand for this program the past several years. SCS has participated in this program in 18 states to date. Eight studies have been completed, and nine more are expected to be completed by July 1973.

The completed reports, which define the areas that are flooded at various frequencies, can be used as a basis for planning and regulations for flood plain use.

Flood insurance studies. The Soil Conservation Service is one of five federal agencies carrying out technical studies for the National Flood Insurance Program of the Department of Housing and Urban Development. SCS, to date, has been involved in studies in 128 communities in 34 states and Puerto Rico.

Communities applying for participation in the flood insurance program must agree to develop suitable regulations for flood plain use within a certain time period. Local officials and planners in many of the communities studied have asked SCS for additional data and interpretations to help them implement flood plain land use and management programs.

Resource conservation and development projects

During fiscal year 1972, 20 new resource conservation and development (RC&D) projects became eligible for planning assistance. Covering nearly 72 million acres, the projects are located in 21 states: Arizona, Arkansas, Colorado, Delaware, Florida, Idaho, Illinois, Indiana, Iowa, Georgia, Kansas, Mary-

land, Michigan, Mississippi, New Mexico, Ohio, Oklahoma, Rhode Island, Texas, West Virginia, and Wyoming. The purpose of these projects is to improve the use of each area's natural resources and the economic and social well-being of its people.

In September 1972, an additional 25 RC&D projects were authorized, making a total of 123 projects underway across the nation by the end of the calendar year.

RC&D projects have a high potential for raising incomes and increasing community facilities. The Lincoln Hills Resource Conservation and Development Project in southern Indiana is a good example of this. The first in the nation, the project became operational in October 1964. It takes in 1,005,440 acres of Spencer, Perry, Crawford, and Harrison Counties. The area, for 70 years, had been plagued by an out-migration of people. But the 1969 census reported more than 64,000 people in the four-county area, an increase of 4,000 from 1960. Local leaders attribute this increase in part to the RC&D project.

Project-sponsored demonstrations in modern timber resource development for local foresters, woodcutters, and sawmill operators have brought increased income and employment. Greater economy in timber production has led to increased contracts with paper factories and other wood users. The wood-chip business alone brings more than \$850,000 to the area every year. Nearly all banks in the area tripled their deposits from 1964 to 1971, and tourism has become a major industry because of RC&D-sponsored recreation facilities and improved hunting in the area.

Environmental impact statements

By the end of fiscal year 1972, SCS had prepared 53 draft and

64 final watershed environmental statements and 18 statements on RC&D project measures. In addition, 1,400 environmental statements prepared by other agencies were reviewed.

SCS is continuing to work closely with the Council on Environmental Quality and the Environmental Protection Agency to improve guidelines and procedures and to clarify areas of responsibility.

In addition, SCS is strengthening its staff assignments and training programs to better meet environmental objectives. These efforts are resulting in broader public participation and in more comprehensive work plans.

Great Plains Conservation Program

SCS's final summary for the 1971-72 blow season showed wind erosion damage in the Great Plains was 50 percent less than the figure for the corresponding period a year earlier. Nevertheless, the need for giving high priority to the Great Plains Program still exists.

Through long-term contracts under the Great Plains Program, farmers and ranchers apply needed conservation treatment on their land in 465 designated Great Plains counties. Priority is given to cropland that is unsuited for sustained cultivation but is still used for that purpose. About 20 percent of all cropland in Great Plains Conservation Program contracts is planned for conversion to grassland.

In fiscal year 1972, 2,440 farmers and ranchers placed nearly 5 million acres under Great Plains Program contracts. More than 42,500 farmers and ranchers now either have completed or have underway contracts for conservation treatment of more than 77 million acres.

Planned grazing systems. During the last fiscal year, more than 6.5 million acres were added to

the acreage already under planned grazing systems, bringing the total to 36.7 million acres.

The short-duration grazing system, a fairly new grazing technique, showed promise of greatly increasing the per acre production of meat and, at the same time, permitting a significant improvement in the ecological condition of grasslands.

More and more the use and management of native grazing lands is assuming the ecosystem approach as livestock operators become more aware of the benefits in planning for wildlife habitat, watershed protection, recreational values, and esthetic qualities in addition to improved forage supplies for livestock.

Management support

One of the SCS's key activities this past year was providing intensive training for SCS personnel in understanding and using the SCS Framework Plan, "Soil and Water Conservation for a Better America." Training meetings on the plan were held in all states.

In addition, increased effort went into the development of procedure and methodology to facilitate implementation of the "systems" concept of the plan. This effort was based on the need to provide program and management techniques for a "built-in" mechanism for relating individual parts of the plan to its overall thrust.

To do this, exploratory work was initiated to develop:

1. Quality standards to identify, measure, and describe the present condition and future potential of various resource management systems. The quality standards can help us to establish re-

source baselines and serve as a means of inventorying and monitoring resource conditions. They will provide some of the information required for extending multiobjective planning assistance to public and private sectors.

2. Planning and programing models to help SCS evaluate its contributions and effectiveness in terms of mission effects, benefits, and objectives and to determine how SCS can best program the use of resources in attaining its objectives. These models will enable SCS to better assist conservation district cooperators, project sponsors, and other groups in developing and implementing multiobjective plans. Conservation efforts will continue to be directed towards improving the well being of rural and urban residents.

Early in 1972, the Advisory Group for Implementing the Framework Plan was established. This group assists in developing and evaluating methods for putting the Framework Plan into action.

International assistance

In 1972, SCS completed technical assistance programs in Nigeria and prepared for completion of its program in India in 1973. Seven years of work in Nigeria resulted in the development of a countrywide soil and water conservation program with U.S.-trained Nigerian professionals ready to take over the work.

SCS continued its program of technical assistance, supported by the Agency for International

Development (AID), in Tunisia and Thailand, with two men in each country.

Nine short-term consultants were provided during the year for work in six countries under agreements with AID, the Inter-American Bank, the Organization of American States, and the Government of Venezuela.

During the fiscal year, SCS assisted 325 individuals who came to the United States from 40 countries to observe and gain experience in various aspects of soil and water conservation. ♦

Summary of Progress, Fiscal Year 1972

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Fiscal year 1972	Cumulative to June 30, 1972	Progress items	Fiscal year 1972	Cumulative to June 30, 1972
Conservation plans and related services			Soil surveys		
District cooperators	No.	89,129	Detailed soil surveys	acres	34,192,963
District cooperators	acres	32,049,222	Reconnaissance soil surveys	acres	7,884,708
Recipients of technical assistance	No.	1,134,871	Total surveys	acres	42,077,671
Technical services	No.	2,985,702	Soil conservation surveys canceled	acres	1,009,950
Recipients applying practices	No.	664,660			
Special mapping for planning and CNI	acres	13,123,171	Snow surveys and water supply forecasting		
Conservation plans prepared	No.	71,020	Snow course measurements	No.	7,502
Conservation plans prepared	acres	26,535,597	Aerial snow marker readings	No.	889
Conservation plans revised	No.	29,570	Mountain precipitation gage readings	No.	2,006
Conservation plans revised	acres	19,796,300	Soil moisture station readings	No.	1,297
Inventories and evaluations prepared	No.	75,467	River stations for which numerical forecasts issued	No.	947
Federal lands in coordinated conservation plans	No.	90	Numerical forecasts issued	No.	2,863
Federal lands in coordinated conservation plans	acres	1,186,302			
State and county CNI reports	No.	83	River basin studies		
			Flood hazard analyses	No.	1
			Flood insurance studies	No.	21
Resource planning and implementation			Watershed and RC&D project measures		
Services for resource planning	No.	101,006	Reservoir-type structure sites:		
Units of government assisted	No.	26,627	Investigated	No.	449
Resource plans prepared	No.	1,188	Surveyed	No.	422
Inventories and evaluations for resource plans	No.	15,539	Reservoir-type structures:		
Land use regulations established	No.	528	Designed	No.	782
Site selection for public facility	No.	2,442	Under construction	No.	1,131
			Flow control structure sites:		
			Investigated	miles	530
			Surveyed	miles	621
			Flow control structures:		
			Designed	miles	718
			Under construction	miles	1,137
Group plans, services, and installation plans			Fish, wildlife, and recreation developments (public):		
Group conservation plans	No.	3,494	Surveyed	No.	21
Group inventories and evaluation	No.	4,742	Designed	No.	64
Groups assisted	No.	14,032	Under construction	No.	22
Services to groups	No.	79,458	Services provided on land rights, agreements, and contract awards	No.	22,983
Groups applying practices	No.	4,446			
Great Plains Conservation Program			Recreation developments		
GP applications received	No.	2,942	Land owners and operators:		
GP applications received	acres	4,983,781	Establishing first commercial enterprise	No.	1,713
GP contracts signed	No.	2,440	Expanding or adding to recreation enterprises for primarily commercial use	No.	1,166
GP contracts signed	acres	4,898,729	Changing to recreation enterprises as primary source of income	No.	181
GP contracts terminated	No.	2,671	Changing to recreation enterprises as primary source of income	acres	55,865
GP contracts terminated	acres	4,316,022	Establishing, expanding, or adding to recreation developments for primarily noncommercial use	No.	33,590
Cropland before GP contract	acres	657,195	Establishing, expanding, or adding to public recreation developments	No.	854
Planned cropland conversions	acres	142,227			
Servicing other USDA programs					
Referrals serviced:					
REAP—Fiscal year 1972	No.	265,860			
REAP—Program year 1971	No.	—			
Cropland Adjustment Program	No.	25			
Appalachian Program	No.	1,182			
Conservation plans approved	No.	754			

Summary of Progress, Fiscal Year 1972—Continued
Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices		Fiscal year 1972	On the land June 30, 1972	Practices		Fiscal year 1972	On the land June 30, 1972
Bedding	acres	29,405	730,149	Minimum tillage	acres	2,288,857	24,073,162
Brush control	acres	4,090,040	50,594,356	Mulching	acres	50,761	765,955
Chiseling and subsoiling	acres	821,960	7,903,175	Open channels	miles	619	16,459
Clearing and snagging	miles	486	7,265	Pasture and hayland management	acres	10,992,017	65,972,292
Commercial fish ponds	acres	7,340	67,757	Pasture and hayland planting	acres	3,114,219	70,502,583
Conservation cropping system	acres	20,127,220	204,906,360	Pipeline	miles	3,412	34,422
Contour farming	acres	3,073,384	49,520,556	Planned grazing systems	acres	6,559,636	36,724,027
Critical area planting	acres	178,963	4,857,336	Ponds	No.	53,339	1,887,720
Crop residue management	acres	19,287,613	171,157,557	Prescribed burning	acres	455,841	4,745,891
Dams, diversion	No.	360	27,431	Proper grazing use	acres	57,082,236	257,401,989
Dams, multiple-purpose	No.	264	7,007	Pumping plant for water control	No.	3,049	86,104
Dams, multiple-purpose	acre-feet	334,616	15,203,100	Range seeding	acres	441,711	15,884,781
Debris basins	No.	2,971	77,705	Recreation area improvement	acres	51,995	1,151,151
Deferred grazing	acres	13,000,462	77,828,852	Recreation land grading and shaping	acres	38,614	478,449
Dikes	miles	333	11,646	Recreation trail and walkway	miles	705	9,748
Disposal lagoons	No.	1,616	3,700	Road access	miles	2,255	22,659
Diversions	miles	2,222	99,368	Spring development	No.	3,545	129,130
Drainage field ditch	miles	4,491	185,603	Stock trails and walkways	feet	335,397	22,710,937
Drainage main or lateral	miles	4,642	373,316	Streambank protection	miles	250	8,534
Drains	miles	22,123	859,014	Stream channel stabilization	miles	32	1,035
Farmstead and feedlot windbreaks	acres	43,180	742,342	Stripcropping	acres	413,889	23,327,947
Fencing	miles	5,137	493,183	Structures for water control	No.	65,664	2,026,183
Field borders	miles	1,123	46,304	Terrace, basin	miles	156	2,170
Field windbreaks	miles	3,364	92,911	Terrace, gradient	miles	9,700	779,489
Firebreaks	miles	3,420	30,973	Terrace, level	miles	6,778	386,849
Fish stream improvement	feet	107,670	1,835,702	Terrace, parallel	miles	5,769	81,135
Fish raceways	feet	48,714	175,643	Total terraces	miles	22,403	1,249,643
Fishpond management	No.	62,384	641,206	Toxic salt reduction	acres	42,692	1,478,596
Floodwater diversions	feet	74,559	1,524,388	Tree planting	acres	398,443	19,710,982
Floodwater retarding structures	No.	433	11,322	Troughs or tanks	No.	11,841	510,236
Floodwater retarding structures	acre-feet	172,453	5,679,604	Waterspreading	acres	125,469	1,134,817
Floodways	feet	49,131	4,284,394	Wells	No.	6,628	555,259
Grade stabilization structures	No.	13,181	221,916	Wildlife upland habitat management	acres	7,110,649	39,717,878
Grassed waterway or outlet	acres	79,440	2,095,851	Wildlife watering facility	No.	1,778	22,833
Grazing land mechanical treatment	acres	30,377	1,433,633	Wildlife wetland habitat management	acres	481,356	4,642,447
Heavy use area protection	acres	2,404	122,864	Woodland direct seeding	acres	13,477	727,782
Hedgerow planting	miles	357	24,368	Woodland improved harvesting	acres	1,340,488	30,940,555
Hillside ditches	miles	86	3,160	Woodland improvement	acres	365,823	15,721,310
Holding ponds and tanks	No.	1,932	2,903	Woodland pruning	acres	12,553	140,337
Irrigation canal or lateral	miles	171	49,530	Woodland site preparation	acres	248,483	4,588,409
Irrigation ditches and canal lining	miles	985	32,755	Land treated			
Irrigation field ditches	miles	1,471	126,952	Land protected during development	units	523	3,685
Irrigation pipeline	miles	4,644	88,418	Land protected during development	acres	13,760	110,553
Irrigation pits or regulating reservoirs	No.	1,198	50,035	Land adequately treated	acres	34,167,099	—
Irrigation storage reservoirs	No.	201	41,269	Land adequately protected	acres	—	758,274,506
Irrigation storage reservoirs	acre-feet	12,115	8,917,640	Land use conversions¹			
Irrigation systems, sprinkler	No.	3,867	130,781	Cropland to grassland	acres	997,736	26,426,080
Irrigation systems, sprinkler	acres	297,829	7,805,171	Cropland to woodland	acres	37,094	2,965,135
Irrigation systems, surface & subsurface	No.	4,440	155,720	Cropland to wildlife-recreation	acres	48,602	1,508,306
Irrigation systems, surface & subsurface	acres	409,924	15,144,371	Cropland to "other"	acres	53,662	6,018,858
Irrigation systems, tailwater recovery	No.	1,730	16,831	All other uses to cropland	acres	141,161	7,865,158
Irrigation water management	acres	3,474,383	21,331,242	All other uses (except cropland) to wildlife-recreation	acres	477,119	10,500,616
Land grading, drainage	acres	28,213	502,650				
Land leveling, irrigation	acres	296,128	11,267,037				
Land smoothing	acres	199,574	7,159,085				
Livestock exclusion	acres	465,551	13,821,385				

¹ Conversions on the land June 30, 1972, are estimates of conversions since July 1, 1962.

Guidelines for tomorrow

by Vincent J. Price

Information Division, SCS
Washington, D.C.

The Soil Conservation Service in New York has assisted in preparing a comprehensive set of guidelines for developing the Cromline Creek watershed in Orange County, New York. The situation in this watershed is typical of that in many urbanizing areas, so the proposals could have nationwide applicability.

The watershed

The Cromline Creek watershed, 55 miles northwest of New York City in the Appalachian Mountains, is rapidly urbanizing. Agriculture, chiefly high intensity muckland farming and dairy farming, accounts for less than 15 percent of land use in the watershed. Moreover, real estate agencies own nearly all the dairy farms or have the option to buy.

So far, housing developments cover only 15 or 20 percent of the watershed, but the problems of poor land use have arisen.

SCS became involved in the Cromline Creek watershed through a Public Law 566 small watershed project. In planning land treatment measures for the project area, it was obvious to the SCS specialists that traditional agricultural measures such as stripcropping and contouring would be of little value in the face of the watershed's rapid urbanization.

In February 1971, Albert Addison, the SCS state conservationist, authorized Lloyd Wright, the

local SCS district conservationist, to assist local officials in preparing a pilot program on land development and soil and water conservation in an urbanizing area. Recommendations for this program, organized as "Guidelines for Land and Water Development for the Cromline Creek Watershed," took 18 months to prepare.

A major first step was to complete a soil survey of the watershed. The SCS watershed planning party in New York conducted hydrology and hydraulics studies and delineated areas on the flood plain that would be flooded by rainstorms of 2-, 10-, 25-, and 100-year frequency, assuming various degrees of urbanization in the watershed, with and without proposed project measures.

In developing guidelines, Wright worked closely with the newly organized Cromline Creek Resource Planning Committee and its chairman, John Zangrillo. The committee is composed of town engineers from the four towns (geographic divisions) that share the watershed, representatives of the state Department of Environmental Conservation, two directors of the Orange County Soil and Water Conservation District, a consultative engineer representing development interests, a county planner, three farmers, Zangrillo, and Wright.

Studies and surveys made by SCS and the resource planning committee showed that serious problems of flooding, erosion, and pollution could result from urbanization of the watershed.

On flooding, the guidelines report said, "Increased runoff from steep slopes in developed areas is likely to increase the flooding problems. Areas that are not now shown as flood-plain areas may flood in the future if most of the watershed is allowed to be covered with hardtop."

On erosion and sedimentation, "The slope in the upper reaches of the watershed is steep. With urban development, erosion and sedimentation will be a major problem. Soil material will flow down the slow-moving stream and settle out as siltation."

On pollution, "Most of the soils in the watershed are not suitable for onsite septic tank disposal systems. Nonfunctional septic tank systems and siltation are likely to leave the streams very polluted."

The prospect for the creek was grim: "The creek is likely to be reduced to a highly silty stream after each rainstorm, and to a low-flowing sewage stream during the hot summer months."

The guidelines

The guidelines, offering an alternative to this prospect, are divided into six categories: flooding and ponding, erosion control,

land use, water resource development, wildlife and woodland, and recreation.

Flooding and ponding guidelines indicate how to reduce flooding in the watershed and downstream.

The first guideline proposes that construction be limited to areas above the floodline elevation for a 100-year frequency storm, based on 75 percent urban development on 1-acre lots, and assuming existing flood-plain storage. "Adding 75 percent urban development makes this higher than the present 100-year floodline," explained Wright. "The line would be about the level of the present 200-year floodline."

Other guidelines in this category recommend that drainage outlets for areas of less than 1 square mile be designed with a 25-year storm capacity and drainage outlets for areas of more than 1 square mile be designed with a 50-year storm capacity. They also recommended that towns prohibit permanent structures in areas subject to ponding or flooding as shown on the soil survey map. "You could fill in some of these ponds and build on them safely," said Wright, "but we feel there should be water storage capacity within the watershed, and these ponds help provide that capacity."

Erosion control guidelines would "make erosion control part of subdivision regulations" and would recommend the installation of "silt basins to control siltation when other methods will not keep the soil loss under 10 tons per acre over the development period."

Because the upper end of Cromline Creek is a good fishing area, the Department of Environmental Conservation recommended that water temperature for fish and wildlife should be considered before construction of

a basin on trout streams. Wright explained, "DEC doesn't mind silt basins or other structures. They'd rather have them than excessive siltation—but they are right to want proper precautions."

Other erosion control guidelines warn against building on slopes of more than 15 percent and recommend the start of a streambank erosion control project.

The *land use* guideline advises local planners to "work out a system so that farming can be continued in urban areas, making maximum use of muckland and flood-plain soils."

Water resource development guidelines contain specific proposals on how to improve silt basins and holding ponds for recreation and wildlife purposes once the construction is completed and on how to protect ponds from siltation and pollution.

Wildlife and woodland guidelines include recommendations to improve areas that pond or flood and swampy areas for fish and wildlife. They also urge developers to protect as many existing trees and shrubs as possible during the building process.

Recreation guidelines start with the blunt advice: "Preserve a strip 200 feet wide on each side of the Appalachian Trail in its natural state without structures or significant land changes." The trail extends from Maine to Georgia. Most developers are required to leave some open space, so the resource planning committee hopes to encourage towns to require that the open space be left along the Appalachian Trail when developments are built in its vicinity.

The Cromline Creek watershed report includes a number of appendices: These:

—provide sample subdivision regulations that might be adopted by any of the towns within the



Cromline Creek watershed.

—describe the principal vegetative and structural methods of controlling erosion in urban areas.

—explain soil surveys and how soil interpretations can be used.

—explain various land development methods, including the grid method and cluster development.

—give the procedure for use of hydrology and hydraulics data.

—show runoff curves from a storm before and after urbanization. The steep, upward curve of runoff after urbanization dramatically illustrates the dangers of thoughtless development.

What now?

The Cromline Creek watershed guidelines are recommendations, not regulations. But all four towns in the watershed are using some of the recommendations and three of the towns are in the process of incorporating a number of recommendations into local regulations.

In addition, the guidelines have been made available to nearby towns and villages. One town outside the watershed area has



Suburban development encroaching on prime farmland in New York's Cromline Creek watershed. A report outlining soil and water conservation for an urbanizing area recommends that this muckland be preserved for agriculture, with urbanization taking place in other, agriculturally less-valuable areas.

(Below) Richard Babeu, SCS area conservationist, on the left, and Lloyd Wright, SCS district conservationist, checking out a proposed development site in Orange County, New York. Unfortunately, Wright, Babeu, and the proposed site are all on top of the Appalachian Trail, which conservationists feel should be preserved.

incorporated some of the recommendations into law.

Opposition to the guidelines can be expected. Following them can cost a developer money, and they might preclude some development entirely. The Cromline Creek Resource Planning Committee is aware of this, but its first concern is optimum land use and the long-time good effects on the environment in the area. Committee members felt that all of the watershed's residents would benefit if developers use conservation practices, so they presented the developers with various alternative methods, but all the alternatives *start* from the committee's standpoint of good use of soil and water.

Time is running out for the Cromline Creek watershed. One development is built in a flood plain already, and another has been proposed for the Appalachian Trail. Developments have caused excessive erosion, sedimentation, and stream pollution. But Wright is optimistic. "This is a beautiful watershed. Properly developed, it could become an urban area and still be beautiful." ♦



For conservation's sake —and retirement

by Albert Howard
Conservation technician, SCS
Greenville, Missouri

One man is transforming a 1,280-foot mountain in the southeastern Ozarks into a showcase of conservation and ecology practices.

Dan Rothwell, of St. Louis, Missouri, has spent weekends and vacations for the past 13 years improving his 322 acres of rough land in Wayne County. Most of Mt. Finley, the 1,280-foot giant, is on his property, and most of it is covered with timber and granite outcroppings.

Rothwell enumerates such accomplishments as cleared trails usable by jeep and pickup truck, including an access road to the crest of Mt. Finley; food plots and watering ponds for wildlife; brush piles constructed over wooden tunnels and draintile as added protection for small game; bluestem and other grasses planted to improve habitat for

wild turkey; stands of shortleaf pine started from seedlings.

"This is the center of black bear country in Missouri," said Rothwell. "Deer and wild turkey abound, and bobcat have been reported. Someday, with more acreage and all of it properly fenced in, I hope to introduce Russian wild boar."

Rothwell made his initial land purchase—85 acres—in 1959 and has since added three adjoining tracts. He eventually would like to own about 1,000 acres.

"When I bought the original tract, travel there was only on foot," he recalled. "Logging had been discontinued for about 50 years, but now nearly 2 miles of old log trails have been cleared or rerouted and made passable. The first road was up a 350-foot incline to the site of our wilderness lodge, which is livable throughout the year."

Rothwell is quick to give credit to the Soil Conservation Service, the Wayne County Soil and Water Conservation District, and the Missouri Department of Con-

servation for the help they gave him in developing a conservation plan for his property.

Rothwell makes about 25 trips a year to what he calls the "mountain ranch." Several groups of more than 30 teenagers from the St. Louis area have visited the Rothwell ranch during summer vacation for ecology hikes under adult supervision. Such visitors are shown the limed and fertilized food plots planted annually with a mix of milo, millet, and soybeans, and other plots seeded with Korean lespedeza and varieties of grasses.

They sit on the banks of the wildlife ponds, which have been stocked with fish. They are shown how animal den trees have been marked so they will not be cut down.

Controlled hunting is one of Rothwell's objectives for his Ozark ranch, but certainly not his prime motivation in improving the environment of Mt. Finley. He envisions an idyllic mountain home in retirement, but for now he has a wilderness hideout for escape from city pressures. ♦



Ecology class in progress. Three miles distant is 1,452-foot Clark Mountain, one of Missouri's highest points.



Tall grasses for small animal cover and erosion control ring this fish pond.

A retreat for summer weekends now; a retirement home in the future.



Fun—far from the crowds

by Edgar Baumann
District conservationist, SCS
Pendleton, Oregon

Families that just want a nice quiet place to have fun, away from the crowds that swarm to public recreation spots, are finding their way to Ray Eckles' new recreation site on his 300-acre farm near Pendleton, Oregon.

Eckles has parlayed some strong springs, which feed a creek cutting through the center of his farm, into a three-activity recreation site. Two spring-fed ponds were built and stocked with trout, providing a safe place for families to take their kids fishing.

He has also allowed the brush to grow along the creek, and excellent upland game bird cover is rapidly developing. To feed the birds hiding in the brush, Eckles leaves a narrow strip of unharvested wheat along the brushy creek banks. This half-mile-long sanctuary yielded a good crop of pheasant and quail last fall.

Water from the ponds can be released to flood several acres of pasture for migratory waterfowl. During hunting season this area

attracts hunters almost as fast as it attracts ducks and geese.

Eckles markets his recreation via leases. A family, or a group, can lease the right to use the area for specific times. Eckles thinks that he will need one or two seasons' experience to determine how many people he can accommodate. He wants to avoid too much pressure on the wildlife and shoulder-to-shoulder hunters or fishermen.

Eckles is only one of several private landowners in the Pendleton area who are helping ease the pressure on public facilities that can't expand fast enough to hold the growing crowds. In many places, overcrowding threatens to destroy or severely damage the very quality that made the spot attractive in the first place.

In addition to the technical help Eckles got from the Soil Conservation Service through the Southern Umatilla Soil and Water Conservation District, he got plenty of encouragement from the Columbia-Blue Mountain RC&D Project recreation committee. Committee members studied the recreation picture in the RC&D project area and learned that recreation of all kinds was woefully short. They have urged several landowners in the area,

who have the land, the temperament, and the time, to go into the income-producing recreation business.

Several private recreation spots in the area have opened recently or have been enlarged. Near Emigrant Springs State Park, 25 miles east of Pendleton, Don Windsor and Bob Trollier are developing two spring-fed trout ponds that will add diversity to the picnic facilities available at the state park.

Thornhollow Fish Farm, 10 miles up the Umatilla River from Pendleton, has five ponds. Three are stocked with Rainbow trout and Kamloops and are available for fishing—for a fee.

A recently completed recreation plan for Lehman Hot Springs and a loan from the Small Business Administration has put this resort on the map again. About an hour's drive south of Pendleton, the hot springs will be available for swimming, with hiking, fishing, and camping nearby.

To increase youth recreation opportunities, the Pendleton Kiwanis Club has signed a 10-year agreement with the U.S. Forest Service for use of the old Buck Creek Cabin at the forks of the Umatilla River. A recreation plan has been completed with

help from several local, state, and federal agencies. Kiwanis members have made many improvements to the old cabin, built during the depression by the Civilian Conservation Corps. A new fish pond has been built, and restrooms and cooking facilities have been improved.

Unlike the strictly private operations, the Kiwanis Club charges only for utilities. Civic and church groups often use the cabin. And the Pendleton schools go there for conservation education.

The Columbia-Blue Mountain RC&D Project area, like all of Oregon, is facing an increasing tourist and recreation load. But those who are willing to pay a little extra can still do their hunting, fishing, or camping away from the crowds. ♦



(Above) This pond on the Ray Eckles farm near Pendleton, Oregon, is already a popular get-away-from-the-crowds fishing spot. In a few years, evergreens will provide even more privacy and seclusion. The brush in the background is growth along a spring-fed creek where upland game birds travel safely between feeding areas.

(Left) Not quite sure what to expect because she has never fished before, Lori Kempf awaits some action at the end of her line. Pendleton, Oregon, schoolchildren can learn about fishing and the outdoors at the Kiwanis Club's conservation education facility in the Umatilla National Forest.

Cover for bare ski slopes

by James A. Weston
District conservationist, SCS
Ogden, Utah



What do you do about bare ski slopes in the arid West? You provide cover by seeding—or else a good part of the topsoil ends up at the bottom of the slope. Because of their steep grade, ski slopes are subject to severe erosion from spring snowmelt.

Two ski resort managers in Utah didn't wait to find most of their subsoil gone before establishing permanent cover on their ski slopes.

Dr. Alvin Cobabe, manager of Powder Mountain Resort in Ogden Valley, seeded crested wheatgrass on part of the slopes to establish sod. A straw mulch was used to protect the seedbed from erosion and hold the tiny seeds in place.

Seed and straw had to be applied by hand because the slopes are so steep. Dr. Cobabe had trouble maintaining the grass stand and, after discussing the problem with a Soil Conservation Service specialist, decided conditions were not favorable for growing crested wheatgrass.

An elevation of 9,000 feet, steep slopes, a short growing season, and excess moisture are not the best conditions for growing crested wheatgrass.

Most snowmelt in that area occurs late in June and early in July—the time when crested wheatgrass normally is headed. Several other species of grass were considered, but it was decided that the best bet would be a mixture of 'Durar' hard fescue and 'Tegmar' intermediate wheatgrass. This mixture requires little maintenance and provides good ground cover and protection in a short growing season.

How much topsoil will end up at the bottom of the slope before the skiing season begins?



Crested wheatgrass protects this slope.

Tegmar is a dwarf form of intermediate wheatgrass especially adapted for soil stabilization. It is easily established, sods rapidly, and is late maturing. It is adapted to areas where precipitation is 12 inches or more annually and has proved effective in stabilizing cuts and fills of roadways, strip mine areas, and ski slopes.

Durar hard fescue is a low-growing deeprooted perennial bunch grass that is well adapted to heavy use. It makes a good wear-resistant, low-maintenance turf in areas that receive 14 inches or more of precipitation annually. This grass performs well on north and east-facing slopes, makes a good soil-binding turf when seeded in pure stands, and is a good understory plant when seeded in mixtures.

At the Nordic Valley Ski Resort, about 15 miles out of Ogden, Utah, a considerable amount of smooth brome grass was planted on the ski slopes in the summer of 1971. The brome is providing adequate cover; Art Christensen, the resort manager, is happy with results so far. But, for comparison, he plans to plant a few pounds of the Durar-Tegmar combination.

"The first thing to do for ero-

sion control on ski slopes in the arid West," advises Dr. Cobabe, "is to clear the slopes up and down. It's essential to leave small terraces or water bars across the slope to slow up water movement. After grading and terracing are completed, the slopes should be seeded."

Both resort managers have found the best time to seed is late in fall—or after the first skiff of snow. After the seed is sown, usually by hand, a straw mulch is applied over the seed. Straw left on the ground through the winter settles over the seed and makes a good seedbed—and it helps control erosion in spring when the snow melts.

Another method is to apply straw in the fall and plant in the spring. Dr. Cobabe believes that fertilizer is most important in getting a stand of grass on raw cut slopes. Just like any good farmer giving a healthy start to his crop, he applied 100 pounds of nitrogen per acre over the grassed ski slopes.

"There are still problems to be worked out in protecting ski slopes in the West," admitted Dr. Cobabe. "But we've come a long way with the conservation practices we're using." ♦

So you want to live in the country?

by William R. Hauck
RC&D project coordinator, SCS
Littleton, New Hampshire

Rear Admiral James T. Brewer stopped issuing orders when he left the Navy 15 years ago. Now, retired and living in a small Connecticut River Valley town in northern New Hampshire, he issues advice to hundreds of city people looking for a country home.

"If you expect to escape the rat race of the city," cautions the Admiral, "the first thing to do is to slow down. If you don't, all your frustrations will come with you to the country. Don't transplant your urban habits in a new setting. If you're planning to buy, take your time.

"Many rural newcomers think they left water problems back in the city. Look for wet basements and soil slippage around the house. Investigate water supply, septic tank capacity, town ordi-

nances, local real estate costs, and all the things that are going to make you a satisfied country resident."

The Admiral knows what he's talking about. He and his wife chose a farm home in New Hampshire's North Country for retirement. With 15 years of Yankee rural living, he has become a leader in helping protect the rich natural resources of the North Country. As a selectman for the town of Piermont and ex officio member of the town's planning board, he has been instrumental in getting approval of subdivision regulations and zoning ordinances that preserve the natural charm cherished by Piermont's 467 residents.

As chairman of the Executive Board of the North Country Resource Conservation and Development (RC&D) Project, he has extended his advice and concern for prudent use of nature's resources to the northern half of the state.

"RC&D gets government agen-

The North Country Resource Conservation and Development Project takes in the four northern counties of New Hampshire—Belknap, Carroll, Coos, and Grafton. That's 50 percent of the land area of the state, and just over 100,000 people live there.

More than 90 percent of the project area is wooded; the forest-based industry plays a substantial role in the economic picture of the area, as well as the state. The recreation industry rates high also, and increasing pressures are being exerted by land speculators, mainly for second-home developments.

The RC&D project directors and staff give high priority to aiding towns in coping with such developments.

cies working together," said Admiral Brewer. "There was a time when it appeared to many landowners that each agency went its own way. But thanks to RC&D, there isn't any worthwhile project now that lacks the coordinated assistance to get it done. I have found this to be true, and, as a matter of fact, I don't believe there is much that anyone wants to do that RC&D can't find someone, somewhere to help do it."

After executive board approval, the Soil Conservation Service helps round up the needed resources to help put action into requests received from local communities.

New Hampshire has long been popular for second homes, but new interstate highways are bringing more people than ever into the state. "Many of these people, from all walks of life, trying to escape big-city tensions, are so eager to buy a house that they pay any price for any land or any structure," said Admiral Brewer. "That's why I have worked hard to get land use ordinances approved in Piermont."

"One developer from down country, for example, was stopped from building in Piermont on wetland with no sewage facilities. Without our ordinances, there would have been a lot of unhappy landowners within the first year. In general, land speculators shy away from towns having such restrictions."

The Admiral believes that haphazard development creates rural slums, denudes the land, fills the streams with silt, and cheats many unsuspecting house buyers.

A little time spent checking property values helps everyone except the land speculator, according to the Admiral.

"The house buyer in a hurry also threatens the agricultural industry," he explained. "The high price he pays for property un-

balances the tax structure. It's taxing the farmers out of business."

In Piermont, 52 percent of taxes are paid by nonresidents. Piermont is an agricultural town but has many second homes and cottages dotting the landscape.

Admiral Brewer considers the area's RC&D project, with its executive board of 20 members, a valuable asset, capable of influencing and helping to control growth.

"I do not despair at the changes we are undergoing," he said. "They can be handled with common sense. We should welcome with open arms the properly motivated, prospective nonresident and the conscientious developer and help them to find a desirable site, priced fair and square, and taxed equitably."

"As for the despoiler, the in-and-outer, the fast-buck artist, we should reserve for him the cold shoulder, the frigid, wordless, baleful stare—commonly known in the North Country as Reaction No. 12." ♦

"Piermont is still basically an agricultural town, and we are working hard to protect this important industry. We don't want to see the farmer forced off his farm by high taxes or economic pressures exerted by developers looking for the quick buck." Alfred Stevens, Piermont Planning Board member, on the left, and James T. Brewer, Piermont Selectman, have worked diligently and successfully in getting subdivision regulations and zoning ordinances passed in Piermont.



Flood plain park. A significant item in the Omnibus Rivers and Harbors Act passed by Congress last session calls for a flood plain park to replace channelization of the South Platte River in Colorado. Money originally authorized for channelization may now be used to acquire flood plain land for the park. This could be a precedent-setting action which provides an alternative to stream channelization, according to conservationist observers. The Rivers and Harbors Act, however, prohibited the "Proposed Principles and Standards" prepared by the Water Resources Council from going into effect prior to 1974.

No more corn patch. A sample survey made by USDA's Economic Research Service shows that nearly 60 percent of farmland sold for nonagricultural use was for housing. Subdivisions accounted for nearly 40 percent of the total. Only 15 percent of the acreage surveyed was sold for commercial or industrial use, and 14 percent was for recreational use.

South Carolina State College in Orangeburg County, under a \$100,000 USDA grant, has begun a 5-year study on the economic feasibility of organizing marketing and supply cooperatives by low-income farmers. Specific objectives include analysis of membership, patronage, and performance of existing cooperatives of low-income farmers, and characteristics and attitudes of the farmers. Researchers also will attempt to gage the potential for organizing such cooperatives in South Carolina.

Keep America Beautiful Day has been scheduled for April 28. For the past 2 years Keep America Beautiful Day has been sponsored by the Boy Scouts of America, the Girl Scouts of the USA, and Keep America Beautiful, Incorporated.

Oceans of opportunity. Water, fresh or salt, is under close and constant scrutiny by Garden City (New York) High School students. Some of the students are engaged in bi-weekly sampling of waters and sediments from Manhasset Bay, Hempstead Harbor, and Shinnecock Inlet. Others collect samples from various coastal areas like Fire Island, Jones Beach, and Coney Island. They study waves, currents, and tidal actions. They note the mineral variations in different localities. They correlate the presence of microscopic shells in their samples with normal and abnormal ecological conditions.

Project Safeguard. USDA and the Environmental Protection Agency are cooperating on a new program, "Project Safeguard," designed to help farmers in 14 Southern States—especially those on small acreages—safely use chemical alternatives to DDT. The project is expected to help more than 170,000 farmers control pests with greater safety on small acreages of cotton, soybeans, and peanuts during 1973. The EPA cancellation makes illegal the use of DDT on these crops. The 14 states involved in the educational program are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Missouri, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

Easy pickin's. Orchards of dwarf or semidwarf apple trees have proved profitable not only to the grower but also to the picker. A study in Washington state found that worker productivity averaged about 18 boxes per hour in dwarf orchards compared with less than 12 in orchards planted to standard size trees. During the 1968 harvest, workers' earnings—determined by the piece rate times the picking rate—averaged \$3.37 per hour in dwarf orchards. Pickers in conventional orchards averaged \$2.53.

Review

Suggested State Legislation, Vol. 32. 1973. Council of State Governments (Iron Works Pike, Lexington, Ky. 40505). 373 pp. \$5. The book contains models of legislation for use in writing bills for the 1973 sessions of state law-making bodies. Included are model laws developed at the May 1972 National Symposium on State Environmental Legislation for: Certification of operators of water treatment plants, water distribution systems, and waste water facilities; soil erosion and sediment control; toxic waste disposal act; air pollution control act; solid waste management and resource recovery incentives act; historic preservation legislation; flood hazard area regulation; and power plant silting guidelines.

Regulation of Flood Hazard Areas to Reduce Flood Losses, Volume Two, Parts V-VI. 1972. United States Water Resources Council (Washington, D.C. 20037). 389 pp. \$2. Volume Two is the result of followup studies to Volume One (Parts I-IV) published last year. Volume One explored selected issues in regulation of private and public land uses as a tool of flood plain management. It focussed primarily on basic regulatory issues and riverine flood problems. Volume Two explores in more detail techniques of regulating subdivisions of lands in flood hazard areas (Part V) and regulating coastal flood hazard areas (Part VI). It builds, with only minor repetition, on Volume One and contains additional draft ordinances dealing specifically with subdivision regulation and regulation of coastal flood hazard areas.

Federal Research Natural Areas in Oregon and Washington, A Guidebook for Scientists and Educators. By Jerry F. Franklin, Frederick C. Hall, C. T. Dyrness, and

Chris Maser. 1972. USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station (Portland, Oreg.). [415] pp., illus. \$3.50. A guide to the use of natural scientific preserves (Research Natural Areas) on federal lands in Oregon and Washington, this re-

port gives detailed descriptions of physical and biological features, and maps and photographs, for each of the 45 tracts presently reserved. Indices to Research Natural Areas by vegetation type and plant and mammalian species are included.

Meetings

March

- 3-6 Hardwood Plywood Manufacturers Association, Disneyworld, Orlando, Fla.
- 3-6 American Camping Association, Philadelphia, Pa.
- 9-15 Associated General Contractors of America, San Francisco, Calif.
- 11-14 Farmers Union, Omaha, Nebr.
- 11-16 American Society of Photogrammetry, Washington, D. C.
- 11-17 National Wildlife Week.
- 16-18 National Wildlife Federation, Washington, D.C.
- 17-28 American Association of School Administrators, San Francisco, Calif.
- 18-21 The Wildlife Society, Washington, D.C.
- 18-21 North American Wildlife and National Resource Conference, Washington, D. C.
- 18-21 Association for Supervision and Curriculum Development, Minneapolis, Minn.
- 25-27 National Recreation and Parks Association, Southern Region, Memphis, Tenn.
- 28-30 National Conservation Tillage Conference, Soil Conservation Society of America, American Society of Agronomy, American Society of Agricultural Engineers, and National Association of Conservation Districts, Des Moines, Iowa
- 30-Apr. 3 National Science Teachers Association, Detroit, Mich.

April

- 1-5 American Concrete Pipe Association, Washington, D.C.
- 1-5 American Road Builders Association, Houston, Tex.
- 2-6 American Pulpwood Association, Atlanta, Ga.
- 4-6 Water Resources Congress, Washington, D.C.
- 7-12 National Planning Conference, Los Angeles, Calif.
- 8-13 Association for Educational Communication and Technology, Las Vegas, Nev.
- 9-11 National Water Safety Congress, Tulsa, Okla.
- 9-15 Earth Week
- 15-18 Association of American Geographers, Atlanta, Ga.
- 16-20 American Geophysical Union, Washington, D.C.
- 16-20 Western Snow Conference, Grand Junction, Colo.
- 23-25 National Academy of Sciences, Washington, D. C.

May

- 7-10 The American Institute of Architects, San Francisco, Calif.
- 7-11 League of Women Voters of the U.S., Washington, D.C.
- 13-15 National Forest Products Association, Washington, D.C.
- 13-17 American Water Works Association, Las Vegas, Nevada
- 13-18 National Council of State Garden Clubs, Seattle, Wash.



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From the Administrator:

Beyond figures

The annual report of SCS conservation activities during fiscal year 1972 is featured in this issue of SOIL CONSERVATION.

We can measure the impact of SCS-assisted conservation work in a number of ways. One way is by citing figures and compiling statistics. Another is by looking behind such statistical accounting of accomplishments and noting the physical, economic, and social benefits that come from this work.

Figures themselves are highly impressive. In 1972, for example, more than a million farmers and other landowners received technical help from SCS on their conservation and land use problems. And more than 34 million acres of land were adequately treated from a conservation practice standpoint.

Also, in fiscal year 1972, SCS and conservation districts provided more than 100,000 technical services to 26,627 local and state governments—an increase of 31.6 percent over 1971.

Any agency—any conservation district—can be proud of these statistics. But perhaps a better measure of progress is not solely figures in a report but what they represent in terms of improved communities, happier lives, and a better use of natural resources.

Recently, SOIL CONSERVATION had an article about people in Kemmerer, Wyoming, who, working through their RC&D project, helped provide a sanitary landfill and a new water treatment plant for their community. That's progress.

In this issue, we report how SCS and local people in Orange County, N.Y., helped develop guidelines to guard against excessive erosion, sedimentation, and stream pollution in an urbanizing area. That's progress.

And, a cooperator of the Box Butte County Soil and Water Conservation District in Nebraska was able to increase his cattle stocking rate to realize 10,000 additional pounds of beef annually while improving the condition of his pastures, with help from the Great Plains Conservation Program. That also is progress.

Soil and water conservation is planning for the improvement of soil and water and people. It is stimulating a better use of natural resources, helping farmers produce and live better, opening up new employment possibilities, improving recreation opportunities, and working for a better understanding and appreciation of the environment.

Further, some of the results of our work in 1972 will not be visible for another decade—when the new lake is built, the ranch plan is complete, or the urbanizing area has been built in a rational manner.

Statistics are a necessary tool in evaluating our activities. But beyond figures lie those changes and improvements that may never reach the computer but may result in better lives for our countrymen and our descendants. And that, too, is certainly progress.

Kenneth E. Grant

Conservation

U. S. Department of Agriculture / Soil Conservation Service / March 1973



SOIL CONSERVATION spotlights wildlife this month, especially the efforts of groups and individuals in providing sanctuaries and creating new or improved habitats for wildlife. Note, for example, the dedication of townspeople in Wells, Maine, to preserving a shorebird habitat. And all the way across the country, residents of central Douglas County, Washington, have worked to preserve sage grouse strutting grounds. The motives are similar in still another setting—North Carolina. There a landowner replaced gullies on his land with food and cover for wildlife, and a group of landowners banded together to form a deer restoration project.

COVER: A least tern at nest, photographed by Patrick Grace, a photographer-naturalist from York Harbor, Maine, who co-authored the article about saving a shorebird habitat in Maine. (See p. 171).

OPPOSITE PAGE: A bull elk at the Ft. Niobrara wildlife refuge displaying a beautiful set of antlers.

- 163 Home on the range—for elk and buffalo and Texas longhorns
by Wade H. Hamor
- 167 New game bird takes to California—and to strangers
by Frank J. Menezes, Jr.
- 169 Grounds for grouse
by Ernest A. Busek
- 171 We care about birds
by David N. Allan and Patrick W. Grace
- 174 Small game, big gain
by Nat White
- 176 Wood ducks flock to flooded woods
by Gary Bullard
- 178 Welcome, ducks!
by Rose C. Fleming
- 179 A deer project
by James H. Griffin
- 180 A new plant materials center
by Kenneth Croeni
- 181 Recon . . .
- 182 Review
- 183 Meetings
- 184 From the Administrator
Wildlife rates the best we can give

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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Home on the range —for elk and buffalo and Texas longhorns

by Wade H. Hamor
Regional biologist, SCS
Lincoln, Nebraska



As the little band of Mormons trekked across the Nebraska prairies in 1854, headed for Utah, an old cow broke train and ran into a Sioux village where she was shot by one of the braves—so the story goes. The residue of animosity led to war with the Sioux, which didn't end until the remnant of the tribe was rounded up and placed on the Rosebud Reservation in South Dakota in 1878.

Just across the line in Nebraska, to feed the Sioux and keep them peaceful, the U.S. Army established Fort Niobrara, named after the river along which it lies.



Texas longhorns have adapted well to Nebraska range.

In those days, buffalo and elk roamed the land and drank from the Niobrara at will. Then the Army introduced a new species of critter, the Texas longhorn, to the area. The longhorns were driven up in great herds from the South to feed the Sioux.

A. J. Abbott helped punch longhorns up from Dodge City and stayed on to become one of Nebraska's early cattle barons. And young Lieutenant "Black Jack" Pershing served his early career at Ft. Niobrara.

Today, Abbott is gone, and Pershing is someone to read about in history books. But the buffalo, elk, and longhorn are still there. Small herds of each are being preserved by the U.S. Department of the Interior's Bureau of Sport Fisheries and Wildlife, now in possession of what is left of Ft. Niobrara. The land was opened to settlers in 1913 and reduced to 14,000 acres. A few more have been added, so the holdings now total 19,122 acres.

Ft. Niobrara has become one of a few wildlife refuges where visitors can get acquainted with larger species, some of which are few in number and others hard to see in their native habitat.

Elk are fairly plentiful but, when they run wild, are skittish about visitors. Buffalo, reduced in 1900 to about 300 in all of North America, are increasing in numbers and attract a lot of attention. Texas longhorns are now an established breed, after having been almost eliminated in the evolution of beef animals.

If you have anything to say to either of these species, you can say it at Ft. Niobrara—through a fence or at safe distance. The herds are there partly for their own preservation and mainly for the enjoyment of people.

Early in 1950 some questions arose about animals and grasses at the refuge. How do you manage the ranges to keep animals sleek and fat yet keep the grasses productive in the years ahead?

Can you fence for better management and yet leave plenty of room for elk to run, buffalo to roam, and longhorn to range?

Biologists of BSF&W and range conservationists of the Soil Conservation Service got together to update the range management program, and they began with a range site and condition survey and a study of the feeding habits of the animals.

Buffalo are not buffalo at all, but bison. They feed somewhat like the domestic cow to which they are related. They are cloven-hoofed and chew their cuds and will cross with a cow to produce a *cattalo*.

Elk eat a wider variety of foods, including grass and herbaceous plants, and they browse. They feed on native grasses, but given the chance they also feed on aspen and mixed shrubs.

The Texas longhorn is a cow and so is at home on the range summer and winter.

Because elk browse as well as graze, they skim the top of the grasses. Buffalo follow elk, cleaning up the range down to what is considered proper use. The rule of thumb is to take half, leave half. Resting in rotation, the range forage plants will bounce back for the longhorns to use as grazing or to be cut for hay for them.

In the plan, then, the 1,045-acre elk unit gets some early spring grazing by buffalo to rest the regular buffalo ranges for their improvement.

The two buffalo ranges are on either side of the elk unit, to make switching easier. One range is north of the Niobrara River where there are canyons for the

buffalo to take shelter in winter, even though they can stand more cold than most species. Buffalo, in contrast to the domesticated cow, turn their heads to the wind so the hair lies flat for more warmth. They also dig through the snow for the dormant grasses.

Buffalo calves and mothers stay away from the herd until the young are strong enough to travel, so the whole herd is moved out of the canyons before calving time. The buffalo are moved to the 4,400-acre range where they drop their winter coats, produce milk for their young, and become fat and sleek on the lush native range.

Buffalo herd fairly easily with

a car or truck, but they hate horses.

Longhorns are not known for sweet dispositions either, but they do herd better—unless they get angry. Grazing like cattle, they can clean up a range in a matter of days. That's why they are allotted 11 pastures in their grazing system. Now that herd registry is established, bulls are selected on the basis of size, color, horn spread, and conformity. The best specimens weigh a ton and look as if they stampeded through a paint store with 6-foot horns running interference. Steers weigh less than bulls.

There are only two government herds of longhorn cattle—one at Ft. Niobrara and one in Okla-

The buffalo roam . . .



and roam . . .



homa. USDI acquired a few in 1926 when they were at the point of vanishing.

The small herd of 50 elk at Ft. Niobrara is for exhibition only. These graceful animals do well in captivity. They are easy to keep, breed readily, and soon become accustomed to people. Bull elk grow beautiful antlers, which they shed each year.

The herds of buffalo and longhorn are maintained at about 300 each, to use but not overuse the ranges and to perpetuate both animals and grasses for people's enjoyment in the years ahead.

To meet objectives—preservation of species, enjoyment by visitors, and studies where needed—takes more management than

meets the eye at Ft. Niobrara. Dividing up the ranges took 14 miles of "horse-high, bull-strong, pig-tight" fencing. Buffalo can breach the fence anywhere and anytime, but they don't know it. Elk can jump anywhere they please. One management secret is to keep them all well fed so they don't find out these things.

There are 18 dug wells, all equipped with windmills, to provide plenty of water to help keep the animals contented.

Want to buy a buffalo, elk, or longhorn? You can't, but if your town needs or wants one for its park or zoo, it can probably get one at Ft. Niobrara. Sales are to units of government only or to other nonprofit agencies.

Does your taste run to buffalo-burger, elk steak, or longhorn prime rib? Your church, club, or any public organization can buy a quarter or half of an animal, but it must apply to make a purchase and wait until the slaughter season. Front quarters of buffalo, which include the hump, weigh up to 300 pounds. Humps make the best burgers, but the best steaks are from the hindquarters, which weigh 175 pounds or more. Most surplus animals are sold at auction each year.

You can visit and enjoy the animals any time at Ft. Niobrara. And during the summer there are also prairie dogs, pheasants, and thousands of birds to help entertain you. ♦

and roam, at Ft. Niobrara Wildlife Refuge.



New game bird takes to California —and to strangers

by Frank J. Menezes, Jr.
Civil engineer technician, SCS
Hanford, California

Rio Grande wild turkeys, direct from the Texas brush country, appear to have found a home to their liking in California.

These turkeys are big, tasty, and a challenge to hunt.

They are able to fly a mile out of gun range if necessary.

The man who accomplished the transfer of the new turkey strain to California is Richard Faggioli, owner with Duncan Patty of a 1,100-acre ranch in California's Tulare County, 50 miles north of Bakersfield.

About 8 years ago Faggioli visited an area inhabited by the Rio Grande turkey near San Antonio, Texas. From a blind he watched a flock of gobblers on a distant ridge. He noticed the terrain was strikingly similar to that of his California ranch in the Sierra Nevada foothills.

Because a flock of the Rio Grande turkeys need a range of at least 10,000 acres for a start, Faggioli needed the cooperation of neighboring landowners, and he got it. He also got assurances of help from the Soil Conservation Service staff at Visalia and from George Franklin of the California Department of Fish and Game.

The Faggiolo-Patty ranch gets 20 to 30 inches of rainfall a year and 6 to 20 inches of snow. Elevation ranges from 3,400 to 5,000 feet. The temperature can go

from 90 degrees in summer to 15 degrees in winter. In some years snow will fall at the 3,500-foot level and stay for weeks.

The trees on the ranch are ponderosa pine, black oak, canyon live oak, and incense-cedar.

Native shrubs are mostly mountain-mahogany, squawbush, and manzanita. Grasses and forbs include wild oats, California melic, blue and creeping wildrye, tarweed, bear clover, annual fescue, and an assortment of bromes.

Rio Grande wild turkeys from Texas are doing fine in northern Tulare County, California. These birds are 18 weeks old.





Rio Grande turkeys on winter range.

Experimental plantings for turkey use provided by SCS have resulted in volunteer stands of Harding and brome grasses and Lana vetch.

Faggioli arranged for three shipments of young turkeys for release on the ranch. To get ready for them he built a main holding pen, 30 feet long, 20 feet wide, and 7 feet high. He built releasing pens 1 to 3 miles from the big pen. These were 20 feet long, 8 feet wide, and 7 feet high. He put running water and feeders outside the pens, similar to those inside. This was to help keep the turkeys in the area for a time.

The first shipment of 75 young birds came in August 1968. Faggioli, with help from SCS and the

California Department of Fish and Game, placed bands on the right leg of each turkey.

The first birds were released on September 6, when the turkeys were 17 weeks old. For a time they stayed near the pens but soon showed evidence of adapting to their new surroundings. By November all 75 turkeys had left the area and were seen as far as 4 miles away, but they all returned to the pens.

The second shipment of 78 turkeys came in July 1969. A delay in airline connection, causing the shipment to be without water for 24 hours, resulted in the loss of eight young birds. This shipment, however, seemed livelier and wilder than the first. These birds were banded on the left leg.

Ten birds at a time were released out of the second shipment, most of them at 2-week intervals. All of these turkeys remained extremely wild.

The third group of young turkeys was released in the summer of 1970, banded on both legs. These too remained wild.

The first mating of the transplanted turkeys occurred in April 1969. The winter had been hard, with temperatures as low as 10 degrees. Snow covered the ground

for 93 days. The weather station recorded 67 inches of moisture. At one time, when the caretaker had been unable to distribute food because of the snow, several turkeys appeared on the highway searching for food.

That spring, some of the hens had their nests as far as 3 miles from the main pen. Soon hens were seen with trailing poults. Once 11 hens were sighted with 36 poults in tow.

Later observations indicated the hatches were occurring at different times. The poults ranged in size from that of a quail to a pheasant.

Gobblers caught and weighed after the first year averaged more than 17 pounds each.

There were unexpected incidents. In Sequoia National Park two gobblers and five hens learned to wait along the highway for handouts from tourists. Two gobblers, still taking handouts, were seen near the highway in July of 1972. One tourist reported he was attacked by a gobbler trying to get his sandwich.

The wild turkey population in northern Tulare County is estimated now at 625 adults. The county has a new game bird, and the outlook is good. ♦

Grounds for grouse

by Ernest A. Busek

District conservationist, SCS
Waterville, Washington

Sage grouse are not without friends in the dry range and wheat lands of Douglas County, Washington. Two essentials to their survival, strutting grounds and water, are being preserved and even improved by county residents.

To develop new water sources and preserve strutting grounds for the sage grouse required a several-step project that drew on the talents of biologists, engineers, conservation contractors, and, most important of all, the landowners.

In Douglas County, surface water is scarce, but there are many places where water is only a few feet below ground. In the right place, usually a wildrye basin, a dry lakebed, or a seep area, a 30-foot-square waterhole can be dug.

In the past 2 years about 35 landowners have dug 45 waterholes, each about 8 feet deep. A backhoe is used for digging. The sides of the waterholes are sloped, and in one corner a ramp is dug to provide easy access for four-footed animals.

Each pit cost between \$75 and \$100. Generally, federal cost sharing was available, and the Soil Conservation Service helped

Strutting sage grouse. (Photograph courtesy of Washington State Game Department.)





A wildlife watering pit. The giant wildrye provides excellent habitat for upland game birds and mule deer.

in locating the right spot to dig and in designing the pits.

The sage grouse strutting grounds are flat grassy areas where each spring this unique bird goes courting. First the males establish a territory; then they

compete with each other in an attempt to attract females into their area by puffing out their chest, opening and closing their tail feathers, and emitting booming calls that come from their colorful throat pouches.

The grassy strutting grounds surrounded by sagebrush are essential to this species. Don Galbreath, Chet Ball, and Larry Wadkins, biologists with the Washington State Game Department, helped locate suitable strutting grounds in Douglas County.

Once the prime sites are located, ranchers and SCS people can plan brush control manage-

ment programs to preserve enough of the sagebrush and thus insure continued use of the grounds by the grouse.

Sage grouse aren't the only benefactors. Throughout spring, summer, and fall, mule deer, mourning doves, song birds, hawks, owls, and coyotes find the watering pits tucked in patches of giant wildrye a welcome relief from the parched surroundings.

Environmental protection is not just a catchy phrase to the residents of central Douglas County. It is a plan of action, and the results make it all worthwhile. ♦

We care about birds

by David N. Allan
Biologist, SCS
Durham, New Hampshire

and Patrick W. Grace
Photographer and naturalist
York Harbor, Maine

A tern drifts like a small white kite against the summer sky. Plunging to the bay below it brings up a small killifish quivering in its bill. On the dunes below, the beachgrass scribes arcs in the sand as an onshore breeze sends sand particles scurrying across the flats. Nearby, faint pipping can be heard from two speckled eggs lying in a shallow cup of sand, soon to release the young terns struggling inside.

The setting is a landfill area of about 21 acres created in the sixties by a dredging project to deepen the Webhannet River at Wells, Maine. The area, teaming with summer life, was once part of the nearby marsh now set aside as the Rachel Carson Wildlife Refuge.

A local resident began observing the use of the landfill by the least tern in 1968. By 1969 at least 40 terns were nesting there. No counts were made in 1970 because the last dredging was being carried out. By the following year about 75 terns were using the fill.

Other birds, including the piping plover, horned lark, and killdeer, also were nesting in the area.

The least tern is not a rare and endangered species, but along the Maine coast it is an uncommon nester, mainly because most areas suitable for nesting are heavily used by vacationers. This tern prefers to nest on coarse sand or

gravelly material that is free of vegetation. The piping plover tolerates more cover, and the horned lark nests in dense stands of beachgrass. Both terns and plovers line their nests with white clamshell fragments. These help bird watchers locate nesting sites.

By 1971 the natural revegeta-

tion of seaside plants such as sea rocket, common saltwort, amaranths, and beachgrass had begun. But the area was not protected, and it was soon invaded by dune buggies and other vehicles.

The town of Wells asked the steering committee of the Threshold of Maine Resource Conser-

A least tern chick and an unhatched egg. The least tern is an uncommon nester along the Maine coast because most areas suitable for nesting are heavily used by vacationers.



vation and Development Project for help in controlling wind erosion on this new land. The barren spoil was subject to severe wind erosion, and the blowing sands had an adverse effect on shellfish, the marsh, and a nearby restaurant and marina.

The Soil Conservation Service helped draw up three alternative vegetative measures. The first: completely vegetate the landfill using beachgrass. The second: use beachgrass around the perimeter of the area with alternate strips of beachgrass or a switchgrass-lovegrass seeding mixture; make the strips perpendicular to the prevailing winds. The third: completely seed the spoil to a switchgrass-lovegrass mixture.

Biologists, including Brad Sterl of the Maine Department of Sea and Shores Fisheries and Dick Anderson, director of the Maine Audubon Society, and others from several agencies also were called in to evaluate the problem. All pointed up the need of saving this shorebird habitat.

Their recommendation was that two alternate and parallel strips of open sand be maintained on the perimeter of the area. Out of 18 acres, 3 would be set aside for this purpose. And 3 acres nearby would be completely revegetated.

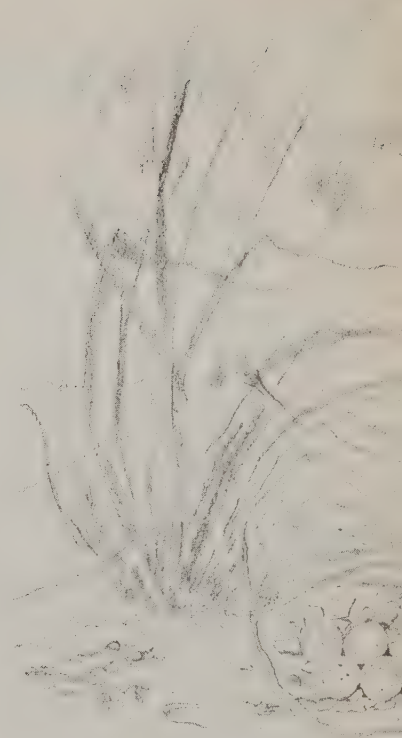
The sponsors of the RC&D project incorporated these suggestions into the second alternative seeding measure.

Pedestrian and vehicular control was needed. Dogs are especially destructive in shorebird nesting areas, so fencing was installed and rugosa rose was planted to discourage access. This rose is a common coastal plant that adds beauty to an area

and provides food and nesting cover for songbirds.

Beachgrass was planted in the spring of 1972 by adapting a cabbage planter to set the grass sprigs. The alternate grass strips were seeded late in July after nesting had peaked. In the fall a grader was used to remove volunteer vegetation from the 50-foot nesting strips. This will have to be done periodically to maintain the nesting habitat.

This landfill was destined to become just another blacktopped shopping mall, motel, or cluster of cottages. Local people, the Wells Conservation Commission, and the RC&D project steering committee with much forethought have committed it to an open area by the sea—a rare and endangered thing these days—where a soaring tern can still be seen. ♦



A natural stand of American beachgrass occurs as volunteer growth in one area of the least tern colony—a 21-acre landfill.



(Top) The piping plover has found suitable habitat in what was once a barren spoil.

(Left) To control wind erosion, clones of American beachgrass were planted in strips perpendicular to the prevailing winds.

(Below) SCS recommendations for the area: 50-foot strips of clones of American beachgrass alternating with 50-foot strips of sown seed.

(Photographs by Patrick W. Grace.)



Small game, big gain

by Nat White

District conservationist, SCS

Randolph County, North Carolina

Some people believe that the best way to get more wildlife on rural land is to leave the land alone.

A father and son team in High Point, North Carolina, believes that wildlife needs all the help it can get—especially on a tract of land that looks like a desert.

Delbert Wilson and his son, Del Ray, bought 157 acres of land in Randolph County in 1969, fully realizing that they had a lot of work ahead of them to restore and improve the land. About 95 acres of the tract presented a generally bleak aspect—

bare and eroded soil, sand, and exposed rock.

Back in the 1940's a previous owner had sold topsoil from those 95 acres, and with the topsoil gone, erosion had arrived and wildlife had left.

"When we bought this place," said Del Ray Wilson, "we could find only lizards and an occasional crow. Nothing else."

Today even a casual visitor to the Wilson place can see rabbits and quail—particularly when it's not hunting season. Del Ray Wilson says he has seen numerous red fox, and even one silver fox,

as well as an occasional mink. Bullfrogs are also numerous, and the lizards and crows are still around.

The Wilsons from the start were determined to reverse the effects of 25 years of soil erosion on their land.

They became cooperators with the Randolph Soil and Water Conservation District. The Soil Conservation Service helped them prepare a conservation plan and gave technical assistance on the work to be done.

The first job was to smooth the severely gullied land, which had

Removing the topsoil left areas like this bare and unprotected.



4 to 10 percent slopes, so it could be seeded to grass. Two bulldozers, a dump truck, a pan for scraping dirt, and a tractor were needed for that job.

The work wasn't easy. The Wilsons recalled that the severe gullies and mudflats presented a real problem—"when it rained sometimes you had quicksand." But gullies disappeared, sediment runoff was reduced, and other progress was made.

Cost-sharing by federal agencies helped provide lime, fertilizer, and grass seed.

In February 1971, Delbert

Wilson suffered a broken back, but his son followed through on the project.

Today, more than 50 of the 95 acres have been greatly improved, and work is underway on additional acreage. A lush growth of ladino clover and fescue has replaced the gullies, and wildlife is increasing.

Small streams on the tract are flowing clear, in contrast to the heavy load of sediment they carried only 3 years ago. Fish, once totally absent, are beginning to appear in the larger streams.

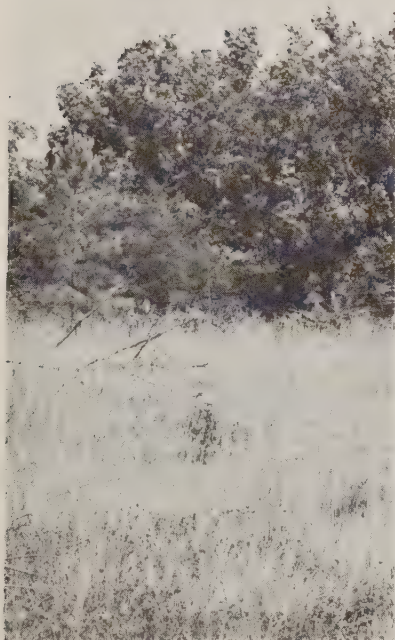
"The work will continue," said

Del Ray Wilson. "When pastures are established, we want to bring in some Black Angus beef cattle. A 10-acre lake will complete the project, from the environmental point of view."

The Wilson family also hopes to build a modern house on an attractive site.

"When we're finished here," Del Ray Wilson added, "this place is going to make a real contribution to the economy and the environment of this county." ♦

A once stripped area shows good growth of ladino clover and fescue.



Wood ducks flock to

by Gary Bullard

Biologist, SCS

Claremore, Oklahoma

The largest natural lake in Oklahoma—150 surface acres surrounded by hardwoods and prime agricultural land—is owned by the Big Lake Club of Tulsa.

The club has been interested in conservation since the turn of the century. At that time, hundreds of hunters would come in by rail to the town of Verdigris and travel the remaining few miles by team and wagon to nearby lakes for a weekend of slaughtering ducks. Sometimes two and three train carloads of ducks were killed per weekend and sold commercially. An old tavern and dance hall were used for the hunters' headquarters and big celebrations took place before and after hunts.

In 1917, several men purchased the big lake and land immediately around it from the U.S. Department of the Interior. By 1946, trustees of the club had signed an agreement with the Rogers County Conservation District to set aside the area for a waterfowl refuge and management area. Last year, Don Welch, one of the trustees, came into the Claremore field office of the Soil Conservation Service and asked for help in updating the conservation plan.

"We want to provide more quality habitat for waterfowl," Welch said.

After discussion with the area engineer and the biologist, it was concluded that a green tree reservoir—the first one in Oklahoma—would be possible. The reservoir was to run parallel with the lake and the Arkansas-Verdigris navigation channel.

The plan required construction of almost 8,000 feet of dikes to flood 140 acres of hardwoods. The area is flooded in the fall after frost and drained early in spring. Water is obtained from the Verdigris River. The water depth in the flooded area ranges up to 18 inches. Tall fescue and small grains are planted on dikes, and other food plots are located in scattered open areas.

"We're proud of the project, but we'd like to do more," Welch commented. "Only part of the lake and woods are for hunting; most of the area serves as a refuge and resting place.

"We've found wood ducks nesting around the lake this past summer, and we're hoping they'll increase as time goes on."

Welch said that the project is expensive, but Big Lake Club realizes that more and more waterfowl habitat is being destroyed each year. The club hopes to offset some of the loss and provide a quality habitat for waterfowl. ♦

flooded woods



This 150-acre natural lake located east of Tulsa is used extensively for waterfowl habitat.



A green-tree reservoir was constructed near the natural lake to improve waterfowl habitat in the area.

Welcome, ducks!

by Rose C. Fleming

Public information specialist, SCS
Jackson, Mississippi

"Mississippi could feed half a million more ducks than it is feeding now. We just need to take advantage of our 40,000 acres in beaver ponds," said Harvey Huffstatler, the energetic young biologist with the Soil Conservation Service at Tupelo.

"And if we managed only 4,000 acres of the 10,000 impounded in floodwater retarding structures, we could have food for 200,000 more ducks."

With cooperation from local landowners, sportsmen, soil and water conservation districts, and agencies such as the Mississippi Game and Fish Commission, the Forest Service, and the Mississippi Forestry Commission, the Soil Conservation Service is moving in this direction in north Mississippi. This is where most of the watershed projects, as well as the beaver ponds, are located.

During 1972, Japanese millet was planted and duck nesting boxes were erected on 13 flood control structures in six counties. Beaver pond development also continued along the lines begun in 1968, when SCS made the first field trial plantings of millet on beaver ponds in Itawamba County.

Huffstatler has inspired much of the current duck activity. Working through conservation districts and SCS district conservationists, he is advising a number of landowners and duck hunting clubs that lease land for waterfowl habitat.

"Until 1968, no waterfowl management techniques had been applied to these areas," said Huff-

statler. "We began that year by planting 100 acres for waterfowl habitat. In 1969, landowners in Itawamba County planted about 500 acres, using Japanese millet purchased by hunting clubs. The program has continued.

"Now the hunters have good hunting, and the landowners are realizing an income from the land."

According to Huffstatler, beaver dams must be broken to lower the water so that millet can be planted on the exposed mudflats.

"Japanese millet is the most successful," he said. "It matures in 60 days and produces about 2,000 pounds of seed per acre without fertilization."

To keep hard-working beavers from repairing their dams, SCS recommends a 3-log drain devised some years ago by Dr. Dale Arner, chairman of the Wildlife and Fisheries Department of Mississippi State University.

Once the millet has matured, the log drains are pulled out and the land is flooded as beavers repair the break. It is this area of food and water that attracts and holds ducks.

"We're doing basically the same thing on watershed reservoirs," said Huffstatler, "and actually they're more manageable. There are about 400 of these reservoirs in the state, designed by SCS and installed as part of watershed projects sponsored by local conservation districts. At least 50 percent of the reservoirs are suitable for waterfowl development."

Huffstatler said it is easy to

lower and raise the water levels—this is done by adjusting the valves on the risers. SCS is putting duck gates, or additional valves, on these water control structures to allow for a 2- or 3-foot water drawdown.

"Periodic drawdowns are also good for the fish," said Huffstatler. "They allow predacious fish like bass to clean up sunfish, bream, and other fish that tend to overpopulate the lake."

To protect the wood duck, the only significant species that nests in Mississippi, Huffstatler has waged a campaign to get nesting boxes erected. Timber companies, sportsmen, Boy Scouts, and various clubs and agencies have already constructed and erected about 500 boxes around farm ponds, beaver ponds, and reservoirs in north Mississippi.

In Benton County, vocational-agricultural students are building boxes that will be set in place by the Forest Service and the Mississippi Game and Fish Commission. In Itawamba County alone, more than 300 vocational-agricultural students have helped build the boxes.

The Itawamba County *Times* and the Tupelo *Daily Journal* have donated thousands of offset printing plates to wrap around trees, thus protecting the boxes from predators. Huffstatler designed the guards with a wing that snakes cannot crawl over.

The boxes are fastened to poles, posts, and dead trees in or near ponds and reservoirs. They represent one more Mississippi "duck welcome" sign. ♦

A deer project

by James H. Griffin

District conservationist, SCS
Smithfield, North Carolina

What started as conversation in the country stores around Smithfield, North Carolina, ended as a project to bring deer and other wildlife back to a 9,000-acre area of wooded flood plain along the Neuse River.

Forty-four landowners in the area banded together several years ago to form the Hackney Deer Restoration Project. They signed agreements with the North Carolina Wildlife Resources Commission, who stocked the project area with deer, not to allow any hunting on their land for 5 years. Besides deer, there are turkey, ducks, and plenty of raccoon in the area.

Everette G. Barefoot, a Soil Conservation Service conservation technician living in the area, helped in getting the landowners to sign the agreements. Three of the landowners, Erwin Stewart, Waylon Jones, and Macy Hoyle, asked the Johnston Soil and Water Conservation District for help with the project. Their request was approved.

Charlie Woodhouse, wildlife biologist with the North Carolina Wildlife Resources Commission, and SCS specialists checked the project area and rated it excellent for wildlife use.

SCS assisted the landowners in the project area in developing conservation plans for improving wildlife habitat, especially habitat for deer. Plants recommended included fescue-ladino clover, small grain, peanuts, sweet potatoes, soybeans, and corn.

"The project has been a success largely because of the land-



The North Carolina Wildlife Resources Commission supplied the deer, and people with an interest in wildlife, like Bennie Guen, supplied the hard work that went into a wildlife restoration project for their area.

owners' attitude," explained Erwin Stewart. "Each of us is responsible for keeping poachers out of the area. There have been very few would-be poachers—word gets around."

Stewart is not a deer hunter; he simply loves wildlife. His cousin, Lloyd Stewart, also has much interest in wildlife and in the wildlife restoration project. So has T. O. Massengill, age 84. Massengill says that he is satisfied just to see a deer occasionally and to know that people can work together to accomplish something. He remembers when this same type of project was started about

20 years ago and failed. He helped to steer this new project around the pitfalls encountered in the first effort.

The North Carolina Wildlife Federation recognized Erwin Stewart and the Johnston County Wildlife Club at its annual meeting in 1971 for their work in the Hackney Deer Restoration Project. ♦

A new plant materials center

by Kenneth Croeni
Manager, SCS Plant Materials Center
Lockeford, California



The Soil Conservation Service has a new plant materials center. The new 106-acre center at Lockeford, California, replaces the Pleasanton Plant Materials Center, which had made substantial contributions to California's agriculture since it was established in 1939.

The Pleasanton PMC was sold to the Alameda County Fair Association. Money from the sale was used to purchase land and to develop a modern facility to serve the expanded vegetative program of California's resource conservation districts.

SCS had been searching for a site that had good soils and irrigation water for high-quality seed production. The area had to be one that could continue to serve agriculture as well as other land uses.

One further consideration was that the site had to be near a large transportation center to provide

easy access for the many visitors interested and concerned with vegetative programs. Lockeford fulfilled the requirements and was the number one choice out of 17 locations. The site was purchased early in 1970.

The Lockeford PMC is near the little town of Lockeford in the heart of San Joaquin County, one of California's richest agricultural counties. The Mokelumne River serves as one boundary, running the full length of the west side of the property.

A well provides water for irrigation and domestic use. The land has been leveled to a satisfactory grade, and nearly 11,000 feet of irrigation pipeline is installed. The unique irrigation pump can provide a minimum amount of water to small test plots or a large quantity to seed-growing fields.

The architectural firm of Schoenwald, Thomas, Harris,

Bode, and Blayney from Fresno designed the headquarters buildings. Paul Harris, the principal architect, used slump stone for the structures to harmonize with the surrounding rural setting. Construction began in the fall of 1970.

The PMC staff transferred grass and shrubs from the Pleasanton site, 72 miles away, to Lockeford. Five acres of valuable native and foreign shrubs have been established and appear to be doing well in their new environment. An acre of grass and legumes in rod rows for critical area stabilization testing is off to a good start. Ten acres of foundation seed were established late in the fall of 1971, and an additional 20 acres were planted in the fall of 1972.

The Lockeford PMC is cooperating with the University of California, the California Division of Highways, the California Department of Fish and Game, resource conservation districts, and the Forest Service's Pacific Southwest Forest and Range Experiment Station (Fire Laboratory) at Riverside, California.

The center serves all of California and part of Nevada—a complex area in which there are more than 700 different soils. Rainfall varies from desert conditions to more than 80 inches; there are wide extremes in temperature. Elevation ranges from below sea level to more than 14,000 feet. The growing season ranges from 135 days in some places to 365 days in others.

The Lockeford PMC is aimed at helping to solve some of the many complex conservation problems of this widely varied area. ♦

The SEAM team. USDA has assigned leadership for the SEAM program (Surface Environment and Mining) to the Forest Service. In addition to dealing with surface effects of mining activities in the Rocky Mountain area, from Mexico to Canada, the program will concentrate on finding ways to meet the nation's energy and mineral needs while maintaining a quality environment. Surface environment problems related to coal, phosphate, oil, and shale form an important part of the project. The Forest Service plans to work closely with the Department of the Interior's Northern Great Plains Resources Program, the Environmental Protection Agency, and with Montana, Nebraska, North Dakota, South Dakota, and Wyoming in the Old West Regional Commission. Cooperators in the project include universities, colleges, and the Soil Conservation Service.

Be prepared. Oakland, Maryland, was ready, or almost ready, when it learned that an industry wanted to buy about 90 acres of land for its new plant in an area where there was a source for 800,000 gallons of water a day, enough natural gas, electricity, and labor, a school facility to help train workers, an adequate sewer system, an access road, and community facilities—library, hospital. Through the efforts of the Garrett County Development Corporation, which had been preparing for such an opportunity for 10 years, and with the help of the Farmers Home Administration, the Office of Economic Opportunity, the Appalachian Regional Commission, and the Soil Conservation Service, Bausch & Lomb Co., one of the nation's top opti-

cal firms, got all it wanted in Garrett County. Bausch & Lomb not only put up its plant and brought a lot of folks back from the cities to join local people in filling the new jobs, but also it built an effluent treatment facility to keep sediment out of clean water.

Lead kills. About 6,000 tons of lead pellets are discharged over waterfowl-use areas in the United States every year. Most of the lead shot falls in deep water, but some falls on hard, shallow bottoms where it can be picked up by ducks and geese and result in poisoning. According to Frank C. Bellrose, a wildlife specialist with the Illinois State Natural History Survey, for all waterfowl species in North America the annual loss because of lead poisoning is 2 or 3 percent of the fall population. With a population of more than 100 million ducks, geese, and swans, the annual loss would be between 2 and 3 million birds.

Well-equipped classroom. Ground was broken late in 1972 for the \$1.3 million, 205-acre Sandy Lake Environmental Learning Center in Pennsylvania. The education benefits will come not so much from an interpretative educational building, according to *Teamwork*, January 1973, but mostly from the center's unique natural surroundings. A project of the Penn Soil Resource Conservation and Development Committee, the center is close to many flood prevention projects, wildlife management areas, strip-mine stabilization activities, and numerous farms on which soil and water conservation projects are being implemented.

Recycle nutrients in effluents.

Areas treated in the wintertime with chlorinated sewage effluents appear to make a better wildlife habitat than untreated areas, reports Gene W. Wood, wildlife ecologist at Pennsylvania State University. Wood and his associates have found that rabbits in the irrigated areas are generally in better health than those in non-irrigated areas. The effluent improves the nutritive value of forages and grasses, especially for protein, phosphorous, potassium, and magnesium.

Using wood wisely. The wise use of sawmill wastes such as edges and slabs and the residue from plywood plants can go a long way in averting further paper shortages in the United States. For example, in the state of Washington enough such wastes are recovered to equal the fiber production on the annual growth of 3 million acres of forest land, points out R. H. Heintz, extension forester, North Dakota State University.

It's no wonder that the United States has a paper shortage, says Heintz. This country uses 575 pounds of paper per year for each man, woman, and child. This compares to 353 pounds in Sweden, 310 in Canada, 43 in Russia, and only 10 pounds per capita per year in China. No wonder that country appeared so clean when President Nixon's group visited there. The Chinese just don't have paper to throw around!

Review

The Earth Around Us. 1972. *Proceedings of the 27th Annual Meeting of the Soil Conservation Society of America (7515 Northeast Ankeny Road, Ankeny, Iowa 50021)*. 242 pp., illus. \$5. The 56 articles, by prominent conservationists in federal and state governments, universities, local organizations, and private industry, are of a multidisciplinary nature and contain relevant and timely information on matters relating to resource management and environmental problems. Four of the papers, representing a cross-section sample of the proceedings contents, are titled: "Man's Changing Perception of the Earth," "Managing Land Use," "The Effect of Forest Management on the Environment," and "Detrimental Aspects of Clearcut Logging on Wildlife."

Aerial-Photo Interpretation in Classifying and Mapping Soils. By Soil Survey Staff, Soil Conservation Service. 1966. Reprinted 1973. *USDA Agriculture Handbook 294*. 89 pp., illus. \$1.50. Outlines the procedures for conducting a standard aerial survey and for using photo interpretations in making soil surveys.

Producing & Marketing Catfish in the Tennessee Valley. 1971. *Conference Proceedings June 30-July 1, 1971, Tennessee Valley Authority, Office of Tributary Area Development Bull. Y-38*. 96 pp., illus. In addition to giving the background of catfish development, the conference had two main topics for discussion: "Catfish Production Systems and Practices" and "New Developments and Needed Changes in

Catfish Production and Marketing Systems." Thirty papers and comments were presented by specialists with federal and state governments, private industry, and universities.

Who Will Control U.S. Agriculture? Harold D. Guither, Editor and Coordinator. 1972. *University of Illinois, College of Agriculture, Cooperative Extension Service (Urbana, Illinois) Special Pub. 27*. 56 pp. Describes the current situation and trends in U.S. agriculture, discusses the factors that will influence its future organization of production, and sketches some of the alternatives and consequences of selected courses of action and their effects upon producers, input suppliers, processors, and consumers.

A Conservation Plan for a Developing Area. 1973. *USDA Program Aid 1029*. 6-page illustrated folder. \$0.20. Explains the need for a conservation plan for a developing area; gives an example of such a plan for a housing development that provides for an attractive environment based on careful use of soil, water, and plant resources. The plan is based on interpretations of the soils in the area. A pictorial map is used to show the developer's plan. The folder also provides 13 measures for the developer to undertake to control erosion and sedimentation in the area during and after construction.

Preliminary Reports on Hurricanes and Tropical Storms: Hurricane Agnes, June 14-23, 1972. *U.S. Department of Commerce, National Oceanic and Atmospheric Admini-*

stration, National Weather Service. 190 pp. Gives data about the amount of rainfall, death toll, and damage caused by Hurricane Agnes, the cause of one of the worst natural disasters in United States history. The record-breaking rains caused devastating floods from North Carolina to New York. Hardest hit were Pennsylvania, New York, Virginia, and Maryland. Florida was ravaged by storm tides and tornadoes. All figures in this report are preliminary and subject to change. Data in the death-damage and impact tables combine the best estimates from state climatologists, the Red Cross, and the Office of Emergency Preparedness.

1970 National Survey of Fishing and Hunting. 1972. *U.S. Dept. of the Interior, Bureau of Sport Fisheries and Wildlife Resource Pub. 95*. 108 pp., illus., in color. \$1.25. Report of a survey done at intervals of 5 years, conducted in two parts. The first part covers persons 9 years old or older who participated in outdoor recreation. The second part covers in detail the activities of those people who participated substantially in hunting and fishing. The number of fishermen and hunters in the second part totals more than 36 million, who spent \$7.1 billion and 910 million recreation days and traveled 39 billion passenger miles.

Indoor-Outdoor Air Pollution Relationships: A Literature Review. By Ferris B. Benson, John J. Henderson, and D. E. Caldwell. 1972. *U.S. Environmental Protection Agency AP-112*. 73 pp., illus. A review was made of all the scant information in published form relating to

indoor-outdoor pollution relationships. The pollutant types considered included gases, particulates, and viable particles (pollen, fungus spores, and bacteria). Building types included residences, offices, laboratories, schools, hospitals, and public buildings. All data of general application to indoor-outdoor pollution relationships are compiled and tabulated in the appendix.

What Is a Farm Conservation Plan? By the Soil Conservation Service. Rev. 1973. USDA PA-629. 8 pp., illus. This publication supersedes Leaflet 249, "What Is a Conservation Farm Plan"? It discusses the best ways to get started in conservation farming, gives an example of a plan in color, and explains the benefits resulting from conservation farming to a farmer as an individual and to his community.

National Environmental Study Area: a Guide. 1972. U.S. Dept. of the Interior, National Park Service. [63] pp. \$0.75. A guide to assist teachers and resource managers who want to establish and maintain a national environmental study area. It describes a national environmental study area; outlines the characteristics and procedures of the program; presents the nature, philosophy, and purpose of environmental education; and discusses techniques and methodology. A bibliography of useful or provocative publications and films is included.

Weed Control With Phenoxy Herbicides on Native Grasslands. Harry M. Elwell and W. E. McMurphy. 1973. *Oklahoma State*

University, Agricultural Experiment Station Bull. B-706. 22 pp. Reports and summarizes the results from several experiments conducted at various locations and years in Oklahoma. These studies involved differ-

ent formulations of 2,4-dichlorophenoxyacetic acid (2,4-D) and other herbicides, spray dates, years, volumes of spray, rates of active ingredients, and methods of application.

Meetings

April

- 1-5 American Concrete Pipe Association, Washington, D.C.
- 1-5 American Road Builders Association, Houston, Tex.
- 2-6 American Pulpwood Association, Atlanta, Ga.
- 4-6 Water Resources Congress, Washington, D.C.
- 7-12 National Planning Conference, Los Angeles, Calif.
- 8-13 Association for Educational Communication and Technology, Las Vegas, Nev.
- 9-11 National Water Safety Congress, Tulsa, Okla.
- 9-15 Earth Week.
- 15-18 Association of American Geographers, Atlanta, Ga.
- 16-20 American Geophysical Union, Washington, D.C.
- 16-20 Western Snow Conference, Grand Junction, Colo.
- 23-25 National Academy of Sciences, Washington, D.C.

May

- 7-10 The American Institute of Architects, San Francisco, Calif.
- 7-11 League of Woman Voters of the U.S., Wash., D.C.
- 13-15 National Association of Counties, Anchorage, Alaska.
- 13-15 National Forest Products Association, Wash., D.C.
- 13-17 American Water Works Association, Las Vegas, Nev.
- 13-18 National Council of State Garden Clubs, Seattle, Wash.
- 14-16 Urban Land Institute, Spring Meeting, Minneapolis, Minn.

June

- 3-6 National Watershed Congress, Wichita, Kansas.
- 3-7 General Federation of Women's Clubs, Baltimore, Md.
- 7-11 National Audubon Society, Denver, Colo.
- 10-15 Outdoor Writers Association of America, Grand Rapids, Mich.
- 17-20 American Society of Civil Engineers, Lexington, Ky.
- 17-22 Ecological Society of America, Amherst, Mass.
- 18-20 American Plywood Association, Gearhart, Oreg.
- 23-26 Ecology Council of America, Catocin Mountain Park, Md.
- 24-28 American Seed Trade Association, Atlanta, Ga.
- 24-28 National Federation of Business and Professional Women's Clubs, San Juan, Puerto Rico.
- 24-30 National Environmental Health Association, Atlanta, Ga.
- 25-29 Air Pollution Control Association, Chicago, Ill.



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From the Administrator:

Wildlife rates the best we can give

For millions of years, wild creatures fended for themselves fairly well against the forces of nature, including disease, predators, and climatic and geologic changes. Some species did very well, evolving into our present varied, beautiful, useful, and indeed necessary forms of wildlife.

But clearly, today's wildlife in this country lives how and where and under conditions that we the people choose, because we control their habitat. We have cut the forests, plowed the prairies, built the cities of this country. And, as we turned the once-untamed land to our uses, we have made the still untamed animals our responsibility.

Most American wildlife is as much a "product" of agricultural land as is corn, cattle, or timber. Rural land is where wild animals live, procreate, and die. It is on farm and ranch lands that they satisfy their basic needs for food, cover, and water.

Farmers and ranchers take this added responsibility seriously. In 1972, farmers, ranchers, and other landowners, with SCS assistance, improved more than 7½ million acres of land and water areas for the benefit of wildlife—a 28-percent increase over the previous year.

In addition, more than half a million acres of our rural land was converted from crop or range land into wildlife and recreation areas during 1972.

But this is only a small part of the farmer's aid to wildlife. Such widespread farm and ranch conservation practices as stripcropping, building ponds—more than 50,000 last year alone, protecting woodland areas, planting windbreaks, and improving rangeland also help to attract many wild creatures.

The Soil Conservation Service has a strong concern for wildlife. We encourage farmers and other landowners to consider wildlife in their land and water use planning, and we stand ready to help them carry out practical measures to do so, such as building watering facilities, planting trees or shrubs to attract wild animals, or using management practices that give a similar result.

In addition, wildlife interpretations are now made for soil surveys in areas where wildlife is, or can be, an important land use. Soils are rated according to their potential for supporting different kinds of wildlife habitat—for grain or seed crops, grasses, herbaceous plants, hardwood trees, shallow water areas, and so on.

Urban people share in the benefits of farmer help to wildlife. As one example, Census Bureau figures show that, in a recent year, two-thirds of America's 14 million hunters did all of their hunting on private land, while nearly 8 million fishermen used small ponds, most of them on rural land.

Farmer, hunter, fisherman, bird-watcher, or city men and women temporarily escaping the pressures of urban life, we all have our reasons for wanting wildlife to thrive in this land of moonshots, color TV, and 50-story buildings. People need wildlife. And a quality environment for people must remember to include a livable environment for the untamed creatures who share our land and water.

Kenneth E. Grant

SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / April 1973



SOIL conservation

April 1973, Vol. 38, No. 9

- 187 **A new crop for the North County**
by Vincent J. Price
- 190 **Iowa farmers and soil erosion**
by Lynn Betts
- 191 **Farmer, rancher help to wildlife grows**
- 192 **Recreation supermaket for big city appetities**
by Carl V. Thompson, Jr., and Jimmy Mangum
- 194 **Grow your own steak?**
- 195 **It's not nice to fool with Mother Nature**
by Charles L. Rowan
- 198 **After coal—what?**
by Donald Oberwager
- 199 **Water 365 days a year**
by Jay M. Hall and Brent Conlin
- 200 **A rural Vermont town plans for its future**
by Barry Stryker and William T. Steele
- 202 **Conservation in action**
- 204 **Recon**
- 205 **Meetings**
- 206 **Review**
- 207 **From the Administrator**
The regreening of America

COVER: When its springtime in the Rockies—and elsewhere—farmers and ranchers are busy! Here, during spring roundup time, a very young calf is roped and is about to get a lift in the rancher's truck.

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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A new crop for the North Country

by Vincent J. Price
Information Division, SCS
Washington, D.C.

The Rural Development Act of 1972 highlights what President Nixon called "our determination to strengthen economic opportunity and community life throughout rural America." The act assigns a large responsibility in rural development to SCS.

The economic improvement of America's countryside will require a serious look at new ideas, industries, and programs. An example of this is occurring in northern Minnesota, where farmers, scientists, and industrial people are working to domesticate a wild grain.

It's called wild rice, although it never was rice, and it won't all be wild much longer.

It's a native, aquatic grass that grows in the lakes and rivers of southern Canada and northern Minnesota and Wisconsin. And, its boosters say, this popular gourmet delicacy is bringing a much-needed lift to the area's economy.

In Minnesota, where more than 60 percent of the world's "wild rice" crop is produced, harvesting of the grain in its natural state is protected by law. Since the current supermarket price of wild rice is often as high as \$6 a pound, the grain could be decimated by continual overharvesting were it not protected.

Minnesota has a yearly open season for harvesting native wild rice that is closely regulated by state law. Minnesotans buy a harvester's license, comparable to a fishing or hunting license, and scout around to locate the most promising stands. On the big day, they pole through the rice growing areas in a canoe, bending the tall stems one or two at a time and knocking off the ripe grain with a stick. At prices ranging from 50 cents to a dollar a pound for rice off the canoe, expert harvesters can do very well. A few years ago, one pair of harvesters earned \$1,800 although the average is closer to \$500.

But in the long run, this colorful method of obtaining wild rice

is uneconomic and represents what economists call an "exploitation industry."

The northern Minnesota area where the grain grows is an economically depressed region. The once-flourishing dairy industry has declined. Mining and forestry still provide jobs, but both industries now are less important. Young sons and daughters often leave for other areas, looking for the jobs they cannot find at home.

So there was more on the minds of local people than providing a larger supply of wild rice for supermarket shoppers when, several years ago, they began to tackle the problems of domesticating the grain. Among the early



John Bedish, SCS state biologist for Minnesota, holds wild rice grown in an SCS-designed paddy.

experimenters were farmers Algot Johnson and Walter Heineman.

Lakes? paddies?

Earlier attempts at domestication had used artificial lakes for wild rice cultivation. About 1964, a few Minnesotans had another idea—paddies. After all, they reasoned, paddies had been used to grow white rice for thousands of years—why not for the so-called wild rice?

But this still left the major problem of how to tame the grain.

In 1965, the Manomin Development Company was organized at Deer River, Minnesota, to determine whether wild rice could be commercially produced in paddies. Manomin—the word is the Chippewa Indian name for wild rice—set as its first goal the development of a nonshattering strain.

The grain of native wild rice ripens unevenly, and as it ripens, it separates on the head of the

plant and falls into the water a few grains at a time. Manomin hoped to develop a nonshattering strain that could be harvested in a “once-over” operation without major losses in the yield. With native wild rice, several passes through the field are needed to harvest any appreciable amount of grain, and even then the yield averages only about 20 percent of the rice.

Several nonshattering strains, including the Manomin, have now been developed and are on the market. Some critics question whether these are true nonshattering wild rice strains. But they are less subject to shattering, they are harvestable by combines, and they provide increased yields.

During this same period, Soil Conservation Service people worked on paddy design and water management, taking into account such diverse factors as flooding and draining, wave action and subsequent dike erosion,

and size requirements for efficient use of farm equipment.

Figures increase

By 1966, an estimated 200 acres of wild rice paddies had been built in Minnesota. By 1969 this had grown to an estimated 2,600 acres. By 1972, the figure had jumped to an estimated 17 to 20,000 acres. Indications are that future paddy development will continue at a rate of approximately 1,000 acres per year.

Seventeen thousand acres may not sound like much in a nation which farms more than 1¾ million *square miles* of land, but to the people of northern Minnesota, it is significant.

“Paddy rice has really helped the economy here,” says Beltrami County Commissioner Carl Falk. “Before this started, you never saw any big tractors here, because no one could afford them. We were really in bad shape. There was nothing here—but now, look around town. And it’s going to get bigger. I think water will finally be our controlling factor. Nothing else in the world is going to stop this.”

There are 3,500 acres of paddies in Beltrami County, and another 1,500 acres designed but not yet constructed. “SCS in Beltrami is now designing paddies at the rate of 1,000 acres a year,” reports SCS District Conservationist Morris Blackburn. “For the last 3 years, paddy design has been our number one priority job.”

The impact of the industry on Beltrami County has been tremendous. “The equipment dealer in Kelliher sold six of those big combines—\$24,000 apiece,” reports farmer Stuart Marrs. “Growing rice keeps money moving, too. Outside of the big equipment and the railroad shipping, the income all stays local.”

Blackburn estimates the 1972 economic impact, based upon wild rice, to be \$1.5 million for

Beltrami County. "There are about 30 families still here because of the rice, who would have left otherwise. And they hire about 60 to 70 part-time helpers," he adds.

40,000 acres

Perhaps those with the most to gain in the area are the 3,000 Chippewa Indians living on the Red Lake Reservation, which has more than 40,000 acres suitable for growing paddy wild rice. In 1972 there were 80 acres of paddies in production, with another 130 acres of paddies constructed that will be seeded in the next 2 years.

The wild rice paddies are a tribal enterprise. Funds are supplied by tribal monies and limited grants from the Bureau of Indian Affairs and the Upper Great Lakes Commission. The initial paddy layout was designed by the SCS in cooperation with the University of Minnesota.

The paddies vary in size from 20 to 30 acres, with individual inlet and outlet waterflow controls. The present paddies are all flooded by a gravity flow system, and an additional 3,000 acres of paddies can be constructed on the same system.

Paddies are evenly divided in acreage between shattering and nonshattering varieties of wild rice. Future acreage will be seeded to nonshattering varieties according to Floyd W. Jorgenson, extension agent for the Red Lake Reservation.

The Chippewa Indians on Red Lake Reservation still face numerous problems in wild rice cultivation, including the very considerable expense of machinery. Their limited money has gone primarily into paddy construction. They would like more funds for wild rice combines and other kinds of equipment needed for a successful operation.

Nevertheless, the outlook is very good. "We have more than 40,000 acres of potential paddies on the reservation," says George Kelly, a member of the Red Lake Reservation and a supervisor of the Beltrami Soil and Water Conservation District. "The reservation has the land and the water supply; all we need is the machinery. Timing is critical as the expansion in the state and adjacent to the reservation is very rapid and profitable at this early date."

The reservation and surrounding areas will receive many indirect benefits from the expansion of rice paddies. For example:

Flood prevention: Spring runoff is used for flooding the paddies, protecting cities along the Red River of the North from unwanted extra floodwater. Thus, the paddies serve as temporary water reservoirs.

Continued on p. 201



Wild rice paddy on Red Lake Indian Reservation. "We've got the land and we've got the water."

Iowa farmers and soil erosion

by Lynn Betts, Information specialist, SCS, Des Moines, Iowa

In 1972, Iowa passed a Conservancy District Act which encourages, promotes, facilitates, and—where public interest requires—mandates the conservation and proper control and use of Iowa soil and water resources. This is the first statewide mandatory soil conservation law in the nation.

Iowa soil conservation districts are required to set reasonable soil loss limits; if the limits are exceeded, and soil erosion is declared a nuisance after a written complaint is filed, the landowner must abate the nuisance. He must receive 75 percent cost-sharing to do this. If the nuisance is not abated, the landowner can be held in contempt of court.

Soil loss limit regulations have been adopted in all of Iowa's 100 soil conservation districts. Several soil erosion-sediment damage complaints have been filed to request abatement, but all have been settled out of court.

Here, three Iowa farmers tell how they feel about the law.

Larry Epling of Merville is chairman of the District Commissioners in Woodbury Soil Conservation District, western Iowa. The law will affect his future—he's been farming for only 7 years.

Larry Epling farms 640 acres of hilly land—typical of his part of the state—in partnership with his father Leroy. About 400 acres are corn; the rest is pastureland for their purebred beef cowherd.

The deep loess soil in western Iowa is easily eroded. The soil limits range from 2 to 5 tons per

acre per year. According to Epling, they are not too strict. He says there was no opposition to the law at the public hearing, and only a few questions.

"Some people misunderstood the law, thinking it covered water damage liability, for example. But the law is really pretty limited," Epling says.

"I haven't heard anyone against the law. Farmers don't know how much erosion they have, but they want to head off trouble before a

complaint can be filed against them. We've had a tremendous amount of soil conservation work going on in Woodbury District the past several years, and people are asking what all they need to do to comply with the law.

"I believe the law has the potential of getting as much conservation work done in the next 20 years as has been done up to now. It has brought the concern of other people for the environment to the attention of the farmer. And it's reasonable," Epling says.

James Hawkins farms 773 acres of land in Lee County, southeast Iowa. His farm is typical of the hilly, rolling land in that part of the state. It's well suited to pasture.

Soil loss limit regulations have been adopted by the Lee County Soil Conservation District. Not many people attended the public hearing, and comments were few. Hawkins says if any people objected to the law, it wasn't at the public hearing.

He says the farmer looks at his farming as a business and feels erosion control work needs to be done, and farmers should go along with mandatory regulations.

"We're talking about the welfare of everyone with a law like this. Farmers are accepting this broader responsibility—it's a trend that is catching on. The professional farmer who wants his land to produce year after year will take care of his farm, and the erosion control law won't affect him," Hawkins says.

Hawkins has built nine or 10

The Law in Action

An Iowa farmer filed a complaint against the State Highway Commission because severe erosion was damaging his property. The commission quickly assigned an engineer to meet with the farmer and soil conservationists to mitigate the erosion.

After a heavy rain, a newly built ballpark in a large Iowa city was causing erosion and sediment damage to adjacent property owners. A complaint was filed, but the parties concerned got together and agreed on grass seeding and sodding work to curb future erosion.

Says William H. Greiner, director of the State Department of Soil Conservation, "The new law is proving a stimulus for parties to get together to solve erosion problems."



Harold Higgins on his farm.

ponds on his land. He manages the hilly pasture ground closely.

"I guess I feel quite strongly about conservation, because I don't have much patience with someone who doesn't care for his land," Hawkins says. "Time is essential in erosion control. Soil is lost forever for a farmer when it leaves the field."

Harold Higgins and his family have 720 acres of rolling land (515 crop acres) near Tama, in central Iowa. The topography of that area is gently rolling to steep in some areas. Crop production is above the state average.

Higgins feels the law is fair, and adds: "It's a good idea to have district commissioners set the limits. In the beginning, some commissioners were skeptical because they thought they would make enemies of their neighbors in enforcing the law. Now they understand the procedure.

"A lack of information on the law might have caused problems,

but I think it was publicized pretty well, so it's had little opposition statewide.

"Some people say the restrictions are too lenient. They want something closer to no erosion allowed at all. But 5 tons an acre is only about 1/32 of an inch, which isn't much. Zero erosion wouldn't be practical."

Higgins believes that "the Conservancy Law needs funding yet to really make it operative. That is probably the biggest criticism of the law.

"I don't think there will be many court cases. When a complaint is filed, there will usually be a reasonable solution to the problem. So far, the law has served as a reminder and a warning to farmers that something can happen if they don't control erosion," Higgins says.

Higgins looks for "a lot of study" on land use regulations in the next 5 years. ♦

Farmer, rancher help to wildlife grows

America's farmers feed not only cattle, hogs, and poultry but everything else that flies, swims, runs, or crawls on farm and ranch lands—an estimated 80 percent of the nation's wildlife.

And, Soil Conservation Service figures show that farmer encouragement of wildlife is on the increase.

In fiscal year 1972, SCS assisted farmers, ranchers, and other landowners in improving more than 7½ million acres of land and water areas for the benefit of wildlife—a 28 percent increase over last year.

Further, more than half a million acres of other rural land was converted from crop or rangeland into wildlife and recreation areas during 1972.

SCS helps landowners improve food, water, and cover for wildlife. Improved habitat increases wildlife populations even faster than stocking.

SCS Administrator Kenneth E. Grant points out that the 7½ million acres of habitat improvement is only a small part of the American farmer's aid to wildlife.

"Such widespread farm and ranch conservation practices as stripcropping, building ponds, protecting woodland areas, planting windbreaks, and improving rangeland also attract many wild creatures," he said.

These and many other conservation practices indicate that American farmers and ranchers continue to be the "host with the most" for wildlife. ♦

Recreation supermarket for big city appetites

North of New Orleans there's a sign beside State Highway 25 which says "Lake Ramsay Recreation Area." Follow it and you're in for a delightful day outdoors.

The 550-acre area is literally a recreation "supermarket" for thousands of fun-seeking "shoppers" from nearby cities. But the specialties of this 4-year old supermarket are fun and relaxation instead of apples and peanut butter.

Lake Ramsay was "born" in 1965 when W. R. (Willie) Core, heavy equipment contractor, and his son, Gary, decided to convert part of their cutover rangeland in rural St. Tammany Parish, Louisiana, into a recreation area.

"Gary and I got tired of seeing this land grow nothing but scrub oak and poor grass," Willie Core said recently, as he looked out over 250-acre Lake Ramsay, "I suppose we could have developed it for improved pasture, but the land was low and wet and not good for grazing. We decided it could be used for something better."

The "something better" was outdoor recreation for thousands of people from the nearby New Orleans area who want to escape the sounds and smells of big city life for a little while.

Planning first

The Cores had learned from

years of conservation farming that good planning is essential for any land use change. "One of the first things we did was to call Z. N. Williams of the Soil Conservation Service and the Bogue Chitto-Pearl River Soil and Water Conservation District for help," Core said. "They showed us which soils were best for sewage treatment facilities and which ones would hold up best for roads. They also advised us on the best grass and trees for the dam and recreation areas and helped select the lake site and design for erosion control practices."

What awaits the fun seeker who goes to Lake Ramsay?

Well, campers enjoy the 313 modern campsites with electrical and water hookups, or the 200 "rough it" tent sites.

Both campers and daytime visitors ride the lake's excursion boat, swim, fish, water ski, picnic, ride horseback, use the paddle boats, or bask in the sun on a quarter-mile white sand beach. A small crawfish pond and a green-tree reservoir for ducks are in the planning stage.

And, for everyone's enjoyment, there is the enchanting Tchefuncta River. Drifting lazily through the campground, this beautiful stream has been left almost entirely in its natural state.

Canoeists enjoy a quiet trip on Tchefuncta (pronounced Tuh-

by Carl V. Thompson, Jr.
Recreation specialist, SCS
Alexandria, Louisiana
and Jimmy Mangum
District conservationist, SCS
Covington, Louisiana



funk'-tee) while the cool, tree-shaded waters provide a genuine "ole swimming hole" for city youngsters, who love the breath-taking plunge into the water from a rope tied to the limbs of a gnarled old oak.

Green power

The popularity of Core's recreation "supermarket," however, has caused some conservation problems.

One big worry is soil erosion and compaction. As Core says, "Soil and grass really take a beating when several thousand people drive and walk over it during the recreation season. However, with some technical advice from the Soil Conservation Service people, and a lot of fertilizer and seed, I believe we've got this problem licked."

Green grass and greenbacks

grow together around Lake Ramsay. More than 10,000 camping families were registered last year. "Since the average stay is 2 days and a family of four spends about \$30 a day in the local area, simple arithmetic tells us that the camping business at Lake Ramsay boosts the local economy in St. Tammany Parish by well over a half million dollars annually," Core said. "Add to this the economic impact of thousands of picnickers, sightseers, fishermen, and other visitors to the lake and it's easy to see that this place has the same influence on the local economy as a small industry."

But Lake Ramsay is more than an income-booster to the Cores. It's an example of how a bit of cutover rangeland can become a beautiful recreation area where thousands of people enjoy the beauty of rural Louisiana. ♦

Camping is big business

There are an estimated 4 million camping vehicles in the nation, at a price scale ranging from \$300 trailers to customized, air-conditioned motor homes selling for \$25,000. If projections by *U.S. News and World Report* are accurate, the number of camping vehicles in use in the United States may double by 1978.

The publishers of *Woodall's Trailing Parks and Campgrounds Directory* claim that public campsites increased from 177,000 to 285,975 between 1967 and 1972—an increase of 62 percent. During the same period, private campsites increased from 267,424 to 534,084—an increase of almost 100 percent.

The upsurge of interest and participation in outdoor activities of all kinds has strained both public and privately owned recreation facilities. Within USDA, the Soil Conservation Service has leadership in assisting landowners with developing sound soil and water conservation practices for various land uses. This includes the use of land for recreation.

A system for appraising the recreation potential of an area's natural resources has been developed by the National Association of Conservation Districts and concerned federal and state agencies. Appraisals are now complete in 2,276 counties or conservation districts and should be complete for over 80 percent of all counties or districts in the nation by June 30, 1973. ♦



Crowded city streets and polluted air are far away from these picnickers at the Lake Ramsay recreation area.

Grow your own steak?

Three

benefits

from

one

idea

Many people are “beefing” about the high price of steak. But Pat Trew, a grassland conservationist with the Soil Conservation Service in Virginia, has a suggestion that can change the situation for some city dwellers, help Appalachian cattle farmers, and improve the Virginia countryside.

Trew points out that the number of rural vacation properties—second homes in the Virginia countryside—is skyrocketing. City people use the land in summer-time but leave much of it idle during the spring, fall, and winter.

Why not, says Trew, put the land to good year-round use. One way might be a partnership between the city man who owns the land, and a nearby farmer, to use the property as year-round pas-

ture for grazing beef cattle. They could jointly own the cattle, or the farmer could pay the owner for grazing his own cows on the land. In either case—

- weedy, untended land could be restored to good grasses and a green “pretty” condition.
- the local farmer could get extra income.
- the urban landowner could quite possibly grow some of his own meat, increase general beef production, and in the process learn more about farming.

Raising beef cattle takes less working time than many other farm enterprises. In addition, Trew suggests that it can be an exciting project for the whole family.

The right kinds of grass are very important. Some common species in Appalachia are little bluestem, indiangrass, mountain oatgrass, bluegrass, orchardgrass, Ky-31 fescue, and timothy.

Grassland Conservationist Trew suggests that a city landowner interested in the idea should talk over his plans with someone who knows the area and is knowledgeable about raising beef cattle. The county extension agent, a cattle-raising farmer, or a banker who loans money to local farmers would be helpful in deciding on the cattle to buy.

Trew points out that Soil Conservation Service people can help both local farmers and city landowners with recommendations for suitable grasses and for a good year-round grazing management system. The informative Agricultural Research Bulletin, *Raising a Few Cattle for Beef*, is also available from the U.S. Department of Agriculture. ♦



Knee-deep in clover and orchardgrass, a Hereford views the world.

IT'S NOT NICE...

Mother Nature's slip is showing.

Her slips and slides show all over the nation. But maybe we've got more than our fair share right in my own county of Cabell, West Virginia.

People try to secure the slips by building expensive retaining walls, planting grass and trees, and sometimes by bulldozing them away. Sometimes people win, but too often they lose, and otherwise lovely homes have to be abandoned for safety's sake.

But homes aren't the only victims of slips and slides. Highways, schools, and underground utilities such as water mains can also snap, crackle, and pop under the pressures of the wrong soil used for the wrong purpose.

Why is Mother Nature so uncooperative? The most common causes are silty soils over an impervious clay or shale layer, ex-

cess moisture, and insufficient support.

A slip often begins to show when soil from the foot of a hill is excavated for a building site or road. Not enough support, combined with too much clay and moisture, is more than Mother Nature can take, and she falls apart.

This is especially true in springtime, when heavy rains cause some soils to slide downhill. An 8-year old Cabell County boy was hurt last month when he tried to escape from his family's mobile home as it slid 4 or 5 feet down an embankment. Rains had undercut the banks, and it suddenly gave way.

Wet basements, cracked walls, backyard erosion, slips, and septic tank failures can also be caused by using improper soils. But, knowledge and effort can control them.

Most basements can be dried up if tile drains are placed around the footers of homes, and gravel is backfilled over the drains. Sump pumps may be needed. Landscaping so that drainage is away from a house also helps.

A septic tank system will certainly fail if installed in soil that has a seasonal high water table, or a soil layer that does not permit downward movement of water. Bedrock close to the surface will prevent the wastes from filtering down. A steep slope may permit the sewage to seep out onto the hillside.

Soil erosion can be controlled by use of erosion control structures and the planting of proper vegetation.

Bill Dunfee, commissioner of the Cabell County Court, says the 1970 Soil Survey Report, prepared by the Soil Conservation Service for the county, is one of



... to fool with Mother

the most important documents available to local taxpayers. It helps local people anticipate soil problems such as slips before they build or develop property.

Dunfee's opinion is shared by other members of the county court which contributed \$4,000 toward the publication.

The report predicts how each soil will behave under different uses, including homes, crops, trees, grass, and intensive recreation. It tells a prospective home builder whether or not the area he has selected is likely to be a suitable site. The report also warns him of potential problems and what he can do about them.

Working through the local Guyan Soil Conservation District, the SCS has helped many land-owners use the soil survey report. As Dr. N. Bayard Green, a Guyan District supervisor tells them, "Don't let Nature give you a 'dirty' deal on soils. Check first and buy later—its the best 'no fault' insurance I know." ♦



(Above) Aftermath of a land slip on Upshur soil.



(Left) Buyer beware. An abandoned house basement built on poorly drained soil.

Nature

by Charles L. Rowan
District conservationist, SCS
Huntington, West Virginia



(Left) Another broken home built on the wrong soil and on too steep a slope. The soil is Muskingum-Upshur, the slope is 40 percent, the damage is major.



(Below) High road, low road, no road. The slip closed traffic one way, and the contracted cost of repairing it was more than \$400,000.

After coal—what?

by David Oberwager
District conservationist, SCS
Douglas, Wyoming

All land is in a state of transition.

Some transitions occur quickly, others more slowly. One of the “quick” transitions occurs on surface-mined land, when it changes from its pre-mine use, to mining, to post-mining uses.

Unfortunately, any widespread idea of returning post-mined land to a useful purpose—much less an esthetically pleasing area—is a relatively recent concept.

The methods for doing this are still experimental in some parts of the country, and they can be expensive. But, often, post-mined land can be reclaimed through the cooperative efforts of man, science, and nature.

The Dave Johnston Plant of the Pacific Power and Light Company is located in Converse County, Wyoming. Coal strip-mining activity had scooped up and rearranged the land into approximately 500 acres of raw spoil banks.

The area was as humped and ugly as the backside of the moon. But it didn't stay that way.

Working with the La Prele-Glenrock Conservation District, and local Soil Conservation Service people, the Dave Johnston Plant people, in 1971, began a new program of reshaping the steep spoil banks, covering them with good topsoil—stockpiled before mining—and seeding the entire area to grass.

Today, the 500 acres of steep-sloped spoil banks are reformed into gently rolling slopes. Topsoil is spread in 4- to 6-inch layers over the entire area, and hay or straw mulch (about 2 tons per acre) is disked into the life-giving soil layer to reduce erosion and speed plant growth. The area is then seeded to a wheatgrass mixture which grows very successfully.

Sounds easy? It wasn't.

Wyoming is part of the Northern Great Plains and has the area's typical low rainfall, high winds, and thin topsoil. The area's fragile ecology—the low recuperative powers of the land after any disruption of natural conditions—means that careful preparation is required for any land use change. For successful mined land reclamation, spoil bank leveling and careful soil preparation must precede the seeding of selected grasses for a successful result.

Experimentation continues to find the best grasses. Currently, six 1-acre plots on mine spoil have been seeded with five grasses and one type of saltbush from the SCS Plant Materials Center at Bridger, Montana. These are 'sodar' streambank wheatgrass; 'critana' thickspike wheatgrass; 'rosana' wheatgrass; pubescent wheatgrass; green needlegrass; and fourwing saltbush, a high protein shub with good grazing qualities.

The results of these tests will be applied to both the Dave Johnston Plant and the company's new Jim Bridger Plant in southwest Wyoming.

The cost of reclamation? Officials estimate it runs about \$500 an acre—which, however, is considerably less than a penny for each ton of coal removed per acre.

And, the reclamation work has brought an unexpected bonus. Deer and antelope are back grazing on land that, not so long ago, couldn't feed a hungry jack rabbit.

Who says transition has to mean tragedy? ♦



Lee Hansen, Pacific Power and Light environmental agronomist, and Ray Short, the company's engineer, inspect growth on seeded spoil piles. The dragline piles at left will be sloped and seeded after mining is completed in the area.



Nationwide...

More than 10,000 landowners reclaimed over a third of a million acres of surface-mined land between 1965 and 1971, according to SCS reports.

SCS Administrator Kenneth E. Grant points out that the reclamation of 338,000 acres of land "has resulted in significant reductions in soil erosion, sedimentation, and acid pollution of streams from these sites. It has added beauty to the countryside. And it has helped turn useless land into valuable property for forest, pasture or range, wildlife habitat, crop production, building sites, and other uses."

Mr. Grant stressed that much more work needs to be done. More than 4 million acres of land had been disturbed as of January 1972, in surface-mining operations for coal, sand and gravel, and some 40 other commodities.

"About 15 percent of the land needing reclamation has been treated in the last 7 years," Mr. Grant said. "This is significant progress when you consider that to date there is no formal program for technical and financial help on these problem sites on private land. Soil and water conservation district cooperators have undertaken mined-land reclamation as part of their overall conservation activities."

A 1971 SCS publication, MP-1082, *Restoring Surface-Mined Land*, is available from SCS offices or, for 15 cents, from the U.S. Government Printing Office, Washington, D.C. 20402.

Water 365 days a year

by Jay M. Hall

Extension agent, RC&D

Brigham City, Utah

and Brent Conlin

District conservationist, SCS

Malad, Idaho

Farmers near Malad, Idaho, now have a year-round irrigation water supply, thanks to a recent Resource Conservation and Development Project measure.

An old diversion ditch had formerly conveyed water from a creek through a flume and into the Upper Deep Creek Reservoir. But floods had eroded the bank between the ditch and the creek. The collapsing bank, along with the leaky old flume and a brush and weed-filled ditch, meant that large amounts of water were lost in transit from the ditch to the reservoir. Farmers were often out of water by early August.

To overcome this problem, the Deep Creek Irrigation Company, owned by the people of Malad, asked for help from the Box Elder, Oneida, and Cache Resource Conservation and Development Project.

The request was approved, and Soil Conservation Service engineers went to work on a solution.

The final plan involved building a concrete diversion structure to safely pass floodwater down the stream. From the diversion structure, water runs in an 18-inch concrete pipe for 2,093 feet, through a siphon, under the creek, and into an open ditch. The ditch carries the water to a metal pipe that takes it down a hill and into the Upper Deep Creek Reservoir.

The new diversion, ditch, and pipe arrangement means that farmers now have nearly 600 acre-feet of additional water for their use. ♦

They're not making more land in Vermont—or anywhere else—these days. And residents of the small rural town of West Fairlee are well aware of the fact.

So the question they faced when it came to making changes in their town was, "What can we do to improve what we've already got?"

West Fairlee, a town of 13,429 acres and 337 full-time residents, nestles quietly in the rolling hills of east central Vermont. It has beautiful woods, an attractive lake, and a kind of picture-postcard New England charm.

Residents of West Fairlee include Vermont natives with four generations of ancestors buried in the old town cemeteries; refugees from the cities who came as retirees; vacationing second-home owners; and industrial workers who commute to nearby towns for their jobs. Each in his own way loves West Fairlee for its quiet natural beauty and attractive rural environment.

Yet, West Fairlee lives in the 1970's and inevitably is subject to change. Recognizing this, the townspeople joined together to see that their town's growth and development would still mean West Fairlee remained a pleasant place in which to live.

The town asked for planning help from the White River Natural Resource Conservation District. An Orange County Natural Resource Technical Team was organized, consisting of members of state and federal agencies, including the Vermont Extension Service, the University of Vermont's Economics Department, and the state's Agency of Environmental Conservation. Other members were recruited from U.S. Department of Agriculture agencies, including the Soil Conservation Service.

The planning procedure consisted of four basic steps: establish town goals; inventory your natural resources; develop a plan; and, carry it out. Local citizens with help from technical team

A rural town its

by Barry Stryker, SCS

Resource development specialist,
Vermont Extension Service
Montpelier, Vermont

members worked on all four steps.

The inventory and subsequent analysis by the technical team was done under the direction of local committees which included selectmen, planning commission members, and other interested citizens. It included detailed soil survey and land use interpretations and sections on economics, recreation, wildlife, agriculture, forestry, and scenic and historic sites. Townspeople and team members jointly toured to see, study, and evaluate the information.

The establishment of West Fairlee's town goals was done by town officials. They used attitude surveys, personal contact, and the natural resource inventory data already collected.

For the next step, the technical team prepared a natural resource report which presented several planning alternatives. This was given to town officials, who later presented it to the townspeople at a public meeting. After their approval, and with minor adjustments, it became part of the town's comprehensive plan.

A quiet rural environment is one attraction of West Fairlee.



Vermont plans for future

and William T. Steele
District conservationist, SCS
Randolph, Vermont

The whole process involved close working relations between townspeople and their technical team. This mutual trust and respect will make it easier to implement the recommendations.

Currently, the town is working on zoning ordinances that are closely tied in with soils and natural resource information. And a technical team recommendation that a fund be established to help pay for easements and rights-of-way for a future public recreation area has been adopted.

The four-step planning done in West Fairlee can be adapted to any community. It helps to eliminate the confusion created when several government agencies try to work with towns individually. The townspeople get better service for their tax dollars. And government agency people benefit by acquiring a better knowledge of programs other than their own, and how they all fit together.

It's a realistic, down-to-earth approach to problem solving. And that's what Vermonters appreciate! ♦

Continued from p. 189

Wildlife habitat improvement:

The individual paddies, with their series of dikes and ditches, serve as excellent habitat for nesting of migratory waterfowl. The paddies are also excellent spawning grounds for the northern pike.

Increased income from hunting:

The reservation sells a special hunting permit for migratory waterfowl says Jorgenson, and the paddy areas are now producing over a thousand nesting pairs of ducks. With improvement in the hunting areas, license sales will increase.

Increased labor demand: With the increase in acreage more labor will be required. As rice yields increase and a stable supply is maintained, a processing plant may follow.

All wild rice growers face a multitude of problems, including some that most farmers have left behind them. Because wild rice is a new crop, specialized machinery is expensive, and for some operations, such as thinning the stand, the right machinery hasn't been developed yet.

Loans are difficult to get, as is crop insurance.

There are plant diseases and

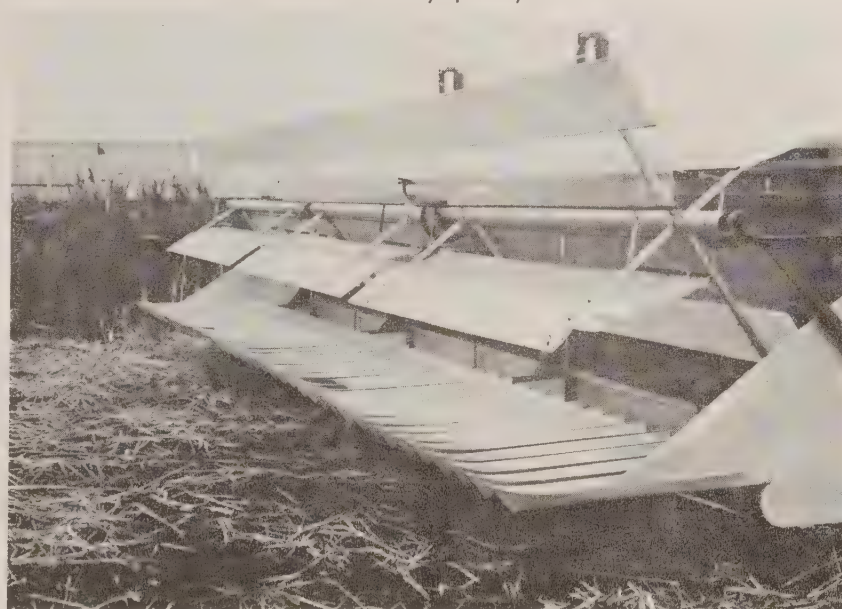
parasites, and more research on wild rice is needed.

Despite the problems, though, the potential of the industry appears to be tremendous. A wild rice growers association has been incorporated to provide members with information on production technology, and to serve as a stimulus to research.

Carl A. Swenson, president of the Manomin Development Company, sees wild rice as the growth industry for Minnesota in the seventies. Further, according to Swenson, "the industry's strong in those counties where the economy is most depressed. These are all counties that need more employment opportunities and more cash flow. This may also retard the flow of our youth into the cities."

Dr. Upadhyaya, developer of Manomin's nonshattering strain and now general manager of the company, puts it succinctly: "Aitken County is classified as a depressed county, and this industry has put a tremendous amount of money into the area. From producers, to implement dealers, to service industries and contractors, taming the wild rice has paid off." ♦

Wild rice harvester in Beltrami County paddy.



conservation

in action

Who stops where?

"At least 14,000 visitors to New Hampshire last summer stopped at two North Country Resource Conservation and Development Project-installed nature trails," says Project Coordinator Bill Hauck. Technical assistance for installing the trails was given by the North Country RC&D Project's Forester Arthur "Gibb" Dodge.

The brief "leg stretchers" are located at Franconia Notch State Park and at a state rest area on I-93 in Sanbornton, New Hampshire. They consist of easy 10- to 20-minute self-guided walks through natural wooded areas. "Their purpose," says Gibb Dodge, "is to give the traveling public a little better understanding of the environment up in our 'neck of the woods,' as well as a chance to relax for a few minutes."

The minitrails have been enthusiastically approved by many out-of-state travelers. One of them, Albert E. Sprague of Seminole, Florida, wrote Gibb Dodge: "It was a most informative and relaxing way to spend a short stop along the way. I wish more states would follow your example."

Two newer nature trails are at the Franconia State Park and the Sanbornton Boulder, and two more are being laid out for use this summer. "Maybe we're lucky," says RC&D Project Coordinator Bill Hauck, "but so far,

at least, we haven't had any vandalism—not so much as a stolen sign."

The short nature trails are one of more than 250 requests for help that the North Country RC&D Project has received. Others range from assistance in stabilizing riverbanks and controlling floods, to providing resource data for town planning officials, to helping organize the removal of more than 6,000 abandoned junk cars from roadsides and vacant lots.

The North Country RC&D Project itself is one of 123 RC&D projects throughout the nation. ♦

Pine tree ring growth from unthinned stand (above) shows good initial growth slowing down. Tree ring below came from thinned stand where rapid growth continued.



Woodland—less is more

Where dense stands of young pine trees conceal the forest floor from the sun, and dead twigs and needles cover the ground, very little wildlife exists because food for it is scarce.

That's how it was in places on the Coffin Sheep Company ranch in Washington's Yakima County—before Chris Coffin started a tree management program on his father's 5,000 acres of commercial woodland.

Today, under the program Chris developed with the aid of Soil Conservation Service specialists, about 75 acres of dense timber have been thinned, and another 100 acres are scheduled for work next year. The thinning will result in an average spacing of 14 to 16 feet on good to excellent sites and 16 to 20 feet on average sites. This should at least double the growth rate of trees that remain and increase their vigor.

Thinning will also open up opportunities for grasses, forbs, and browse plants to grow on the forest floor and to feed more wildlife.

Next year, Chris Coffin hopes to start building some attractive campground areas for the expected influx of deer and elk hunters during the fall season. Operated on a nominal fee basis, the campground will benefit legitimate campers, reduce trespassing, and bring in added income.—LEWIS H. JUMP, *soil conservationist, SCS, Union Gap, Washington.* ♦

Big sky classroom

A classroom under the sky—that's what 240 sixth-grade students from Guthrie, Oklahoma, experienced recently during a 4-day outdoor education program.

The children, all from Banner Elementary School in Guthrie, spent 4 days seeing, touching, and doing as they learned more about the world around them.

The site was a leased 200-acre church camp complete with rolling hills, native grasses, trees, and even a good sized pond for aquatic study.

Linda Tontz, a science teacher at Banner, coordinated the program with help from Howard Potts of the State Department of Education. "I'm really impressed by the enthusiasm and excitement shown by the students," she said.

School Superintendent Bill Wagoner also had high praise for the project. "The way I see it, practically everything we're doing in this outdoor education program complements the student's classroom studies," he said. "If you listen in on one of the sessions, you'll see that the subject matter includes math, history, science, social studies, and first aid—all related to the natural environment."

Cost of the program is shared jointly by the Logan County Conservation District and the school system. Camp rental, insurance, busing, and related items bring expenses to approximately \$1,000.

"Five hundred dollars is no

small financial matter to our conservation district," said Wallace Denny, district board chairman and a strong supporter of the program.

"But we're so convinced about the positive effect this has on the children of our community that we're more than willing to do all we can," he added.—DAN F. CROOM, *information specialist, SCS, Stillwater, Oklahoma.* ♦

The (30-acre) plot against pollution

The Joan of Arc Canning Company of Hoopeston, Illinois, has a new pollution-control sprinkler irrigation system which returns all processing waste water to a 30-acre plot of ground. The method, which involves diking to prevent harmful runoff, meets requirements of Environmental Protection Agency officials in the state.

Soils information prepared by the Soil Conservation Service helped Plant Engineer Frank R. Osborn in developing a workable dike and diversion system. Osborn also credits SCS District Conservationist Ben Wallace with other help in the diking and diversion work, along with assistance in seeding the field to reed canarygrass, planning the location of 7,200 feet of irrigation pipeline, and planting field windbreaks.

The company's previous waste management system had also involved irrigation, but it was inadequate in several respects—the disposal area was limited to 7 acres, it was not diked, and irrigation could not continue through the winter months. Lagoons were used for additional storage, but this caused some odor problems.

The new subsurface delivery system allows for continuous irrigation and eliminates the need for lagoon storage. It features an automatic valve which will divert water to the old lagoons, if need be, as an additional precaution against pollution.

About 300 gallons per minute are sprayed at present, but the system is capable of distributing 500 gallons. There is an 85,000-gallon storage sump at the irrigation distribution point. The pump turns on automatically when the storage sump fills to a certain level.

Because of a wide variance in soil permeability within the 30-acre tract, the system has a timer so that each lateral irrigation line can be set to pump for different lengths of time based upon the soils' ability to absorb water.—JERRY D. SCHWIEN, *public information specialist, SCS, Denver, Colorado.* ♦

Recon . . .

Pesticides. Secretary of Agriculture Earl L. Butz, speaking at the Annual Meeting of the Environmental Writers Association of America, said, "Those who . . . advocate the hasty abandonment of agricultural chemical pesticides . . . should take another look at the realities of the situation. . . . Without modern means of production, the farmers of America could not begin to fulfill the first law of life—the food we all must have—for our population of 210 million."

Don't waste waste. *Farming*, November–December 1972, reports that grass fields irrigated with effluents from food-processing plants can grow lush grass for cattle and sheep. In a current study, a cannery removes the solid wastes from the water at the plant and trucks them away for use as animal feed. The liquid is piped and sprayed on nearby fields by a rotating boom sprayer that covers 13 acres in one sweep.

SCS rescues flowers. When heavy rains pelted a Chesapeake, Virginia, nurseryman's \$70,000 worth of azalea plants, experts warned him to drain the water off quickly or the plants would die. The nurseryman called the local Soil Conservation Service man, who designed, staked out, and helped construct a small drainage ditch, all within a few hours. The speedy action saved the \$70,000 worth of wet azaleas—a plus for beauty and business.

City tree experts. Special training in forestry for a career in cities and towns has been added as a 4-year undergraduate course at the forestry department of Oklahoma State University, department head Dr. Ed Sturgeon announced recently. The new "urban forestry option" was established in response to an increased interest in trees for municipal properties of all kinds.

Beauty. New prices for the "America the Beautiful" color lithograph, as set by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, are: Complete sets (52 prints), \$9.90 by mail order; \$9.25 at GPO bookstores; individual prints, \$0.25 by mail, \$0.15 at GPO bookstores.

Drip, drip, drip. Drip or trickle irrigation is a relatively new method for use in areas of intensively grown vegetable, orchard, and field crops. Idea is to use a pipeline system with spaced outlets that releases water almost directly to each plant.

With the advent of low-cost plastic tubing, drip irrigation is being used throughout the world, with major areas of concentration in the United States, Australia, Israel, and South Africa. According to *Utah Science*, September 1972, there are more than 20,000 acres of drip irrigation in the U.S., and the acreage may double within the next year or so.

Not so cimpel. Project Measure #175 of the Black Hills Area Resource Conservation and Development Project is the simplification of spelling of the English language. Noting that "words should be spelled as they sound," the project measure would like to correct the present situation, in which English "is very difficult to learn, speak, and understand." We wish the sponsors success with this goal, but we fear that the simplification won't be EZ to achieve.

Plants for wild kingdom. Recently SCS's Florida state office provided a list of plants that would fit into an African theme for the wild kingdom development being planned near Disney World. Also help was given in identification of unusual plants that can be used for a Christmas tree decor at Disney World.

Logging. A more complete economic picture must be available before wire rope systems replace conventional skidder systems in the wetlands and mountainous regions of the eastern United States, said participants at a recent conference on cable logging held at Blacksburg, Va.

A major concern of the conference was the scarcity of production and cost figures associated with the use of new wire rope adaptations. Several industries and the U.S. Forest Service are working to provide production and cost indices so that the economic potential of wire rope systems can be properly evaluated.

Beef gains. Results from a 1-year study of beef gains on irrigated pastures reaffirms the importance of top-level management.

The study was designed to determine the beef production potential of yearling steers grazing on intensively managed, irrigated grass-alfalfa pasture and was conducted in cooperation with the Standing Rock Sioux Tribe, Ft. Yates and the Departments of Agronomy and Soils, North Dakota State University.

One of the highlights of the study is a \$48 return per acre to labor and management. Steers averaged 1.97 pounds per day over a 132-day grazing season. The average gain per head was 260 pounds with a stocking rate of 2.7 steers per acre.

Returns to labor and management from other enterprises under irrigation in central North Dakota include: corn silage, \$16.95 per acre; corn for grain, \$19.99 per acre; alfalfa, \$18.85 per acre. Dryland returns per acre for crops grown in the Red River Valley include: soybeans, \$14.71 per acre; pinto beans, \$24.90 per acre; and sunflowers, \$17.50 per acre.

The pastures in the grazing trials were established in the spring of 1971 using a grass-legume mixture consisting of 8 pounds of 'Lincoln' bromegrass, 6 pounds of 'Sterling' orchardgrass, 2 pounds of 'Garrison' creeping foxtail, and 1 pound of 'Vernal' alfalfa per acre. The mixture was double seeded. Oats were seeded as a nurse crop at about 20 pounds per acre prior to seeding the grass-legume mixture.

Average daily gains varied

from a high of 4.4 pounds during the first 20 days of the study to a low of 0.6 pound during August. All steers used in the study were crossbred.

Bass in hot water. Water temperatures affect the growth of bass, according to *Utah Science*, September 1972. In the southern United States, they grow to a weight of 10 lbs. or more, but in the north they are less than half as big.

Meetings

May

- 7-10 The American Institute of Architects, San Francisco, California.
- 7-11 League of Woman Voters of the U.S., Washington, D.C.
- 13-15 National Association of Counties, Anchorage, Alaska.
- 13-15 National Forest Products Association, Washington, D.C.
- 13-17 American Water Works Association, Las Vegas, Nevada.
- 13-18 National Council of State Garden Clubs, Seattle, Washington.
- 14-16 Urban Land Institute, Spring Meeting, Minneapolis, Minnesota.

June

- 3-6 National Watershed Congress, Wichita, Kansas.
- 3-7 General Federation of Women's Clubs, Baltimore, Maryland.
- 7-11 National Audubon Society, Denver, Colorado.
- 10-15 Outdoor Writers Association of America, Grand Rapids, Michigan.
- 17-20 American Society of Civil Engineers, Lexington, Kentucky.
- 17-22 Ecological Society of America, Amherst, Massachusetts.
- 18-20 American Plywood Association, Gearhart, Oregon.
- 23-26 Ecology Council of America, Catocin Mountain Park, Maryland.
- 24-28 American Seed Trade Association, Atlanta, Georgia.
- 24-28 National Federation of Business and Professional Women's Clubs, San Juan, Puerto Rico.
- 24-30 National Environmental Health Association, Atlanta, Georgia.
- 25-29 Air Pollution Control Association, Chicago, Illinois.

July

- 1-6 National Education Association, Portland, Oregon.
- 8-11 American Association of Agricultural College Editors, Guelph, Ontario.
- 8-12 American Society of Landscape Architects, Mackinac Island, Michigan.
- 10-14 National Society of Professional Engineers, Chicago, Illinois.
- 21-25 National Association of Counties, Dallas, Texas.

Review

The Balance Sheet of the Farming Sector, 1972. By Carson D. Evans, Forest G. Warren, and Robert D. Reinsel. 1973. *USDA Agr. Inf. Bull.* 359. 32 pp., illus. Assembles into one financial statement the major farm asset inventory and liability accounts. The value of farm assets (excluding Alaska and Hawaii) amounted to \$339.2 billion on January 1, 1972. Debts totaled \$66.9 billion, leaving equity of \$272.3 billion. The debt-to-asset ratio increased slightly to 19.7 percent. Two-thirds of the \$24.3-billion increase in asset value during 1971 was due to a record \$15.6-billion increase in the value of farm real estate. Most of the remaining third was due to increases in the value of livestock and machinery and motor vehicles. Farm debt increased a record \$5.8 billion. About two-thirds of the increase was in nonreal estate debt and the other third was in farm mortgages. Interest charges on farm debt in 1971 totaled \$3.9 billion, up \$0.2 billion from 1970. Total realized net farm income of farm operators in the 48 contiguous states dropped to \$16 billion from \$16.8 billion in 1970; realized net farm income per farm slipped from \$5,740 to \$5,560.

Stocks of Grain, Oilseeds, and Hay, Revised Estimates by States, 1964-70. 1973. *USDA Statistical Bull.* 508. 39 pp. Estimates of farm, off-farm, and total stocks of corn, all wheat, durum wheat, oats, barley, rye, flaxseed, soybeans, and sorghum grain and of farm stocks of hay have been revised in conformance with revised production estimates for the crop seasons 1964 through 1970. All stocks data are obtained on a position basis, without regard to ownership.

Cattle, Revised Estimates, 1965-70. 1972. *USDA Statistical Bull.* 503. 65 pp. Presents a record of the revised estimates relating to: Number, value, and classes of cattle and calves on farms January 1, 1966-70; calf crop estimate for 1965-69, number of cattle and calves on feed for slaughter market, placements, and fed cattle marketings for 1965-70; and number of cattle farms, 1965-70.

Fomes annosus in the Southeastern United States; Relation of Environmental and Biotic Factors to Stump Colonization and Losses in the Residual Stand. By Eldon W. Ross. 1973. *USDA Tech. Bull.* 1459. 26 pp., illus. \$0.40. Deposition of viable spores by "Fomes annosus," "Peniophora gigantea," and "Trichoderma" spp. over 1-hour periods was recorded at weekly intervals for 1 year in 18 pine stands from Florida to New Hampshire. Study centered on the effects of temperatures, inoculum availability, and competing organisms and their relation to losses in the residual stand. Results indicate seasonal thinning of pine plantation in most parts of Southeastern United States is a practical and effective means of control.

Agriculture in the Upper Great Lakes Region, 1949-69. By Melvin R. Janssen. 1973. *USDA Statistical Bull.* 506. 38 pp. A statistical summary of data from the Census of Agriculture, for the years 1949-69, for the counties in the Upper Great Lakes Regional Commission area. Data include number of farms, total acreage, cropland acreage, value of farm products sold, and number of farms by economic class. The report also includes a summary of the number of oper-

ators working off the farm 100 days or more, livestock numbers, acreage of various crops harvested including vegetables, tree fruits, and nursery stock.

A Bibliography of Tree Nut Production and Marketing Research, 1965-71. Compiled by Dorothy M. Lundquist. 1972. *USDA Misc. Pub.* 1255. 37 pp. Lists production and marketing research reports on tree nuts published from 1965 through 1971. The bibliography contains a section for each tree nut that is important in domestic trade channels. Within each section nut listings are arranged alphabetically by author under subject matter headings. An alphabetical listing of authors, with numbered references, is included at the end of the bibliography.

Range Management Practices: Investment Costs, 1970. By Gilbert Duran and H. F. Faiser. 1972. *USDA Agr. Hbk.* 435. 38 pp. \$9.75. Defines and tabulates investment costs and life expectancies for the 18 range management practices used in the Forest-Range Environmental Study (FRES). Values were determined from published and unpublished sources and from experience of U.S. Forest Service experts in this field.

Simulation of Transport Processes in Soils. By C. T. deWit and H. van Keulen. 1972. *Centre for Agricultural Publishing and Documentation (Wageningen, Netherlands).* 100 pp., illus. Dfl. 15. Purpose is to interest the student and scientist in the simulation of transport process in the soil transport of heat, salts, ions, and water in the unsaturated phase.

From the Administrator:

The regreening of America

April is springtime, Easter, the regreening and replanting season for everyone from full-time farmers to flower-box apartment dwellers. This month, SOIL CONSERVATION has an article on some farmers in northern Minnesota who plant a highly prized crop in paddies.

The paddies, incidentally, are excellent habitat for ducks and other migratory waterfowl. Walled with ditches and dikes, and filled with dense stands of wild rice to provide food and security from predators, paddies are close to an ideal duck habitat. One Minnesota man counted approximately 1,000 ducks, plus woodcock, snipe, sandhill crane, and blue heron on 80 acres of paddy alone.

April has rainshowers which, traditionally, bring May flowers. Unhappily, rain also stimulates the movement of soil from unstable and eroding areas, resulting in accelerated silt and sediment loads in the waterways.

A number of states have passed, or are considering, sediment control legislation. This is partially an outgrowth of a model act suggested by the Council of State Governments and developed by the council working with the National Association of Conservation Districts, state soil and water conservation boards, the Environmental Protection Agency, and the Soil Conservation Service.

Iowa has approached the erosion and sediment problem by setting soil loss limits and providing a mandatory program for control. In this issue, several Iowa farmers describe their reaction to the law.

And, April is income-tax month, so a few words about budgets and money are apropos.

The Soil Conservation Service budget for fiscal year 1974 was presented to Congress last month. The budget reflects reductions felt essential by the Administration to avoid a new round of inflation and the need for a tax increase.

Despite some financial and personnel belt-tightening, we *will* have an active and viable program in the coming year. We will continue to look for better and more efficient ways to do the conservation job. A National Land Inventory and Monitoring Program, under SCS leadership, has been authorized, and this successor to the Conservation Needs Inventory will provide considerably more resource data on which we, and other agencies in this field, can base our work.

All in all, April is quite a month.

Kenneth E. Grant



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Maryland fisherman and rainbow trout on a small watershed project-created lake in Garrett County.

Conservation

U. S. Department of Agriculture / Soil Conservation Service / May 1973

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Land Use Planning ?

"Land use planning" is a multi-meaning phrase that trips easily off the tongue. But it is subject to numerous interpretations. What does it mean in 1973—and to whom does it have that particular meaning?

To find out, we asked a number of different people, and the representatives of some organizations active in land and water use and planning work. Each, naturally, sees it from his or her own professional or geographical viewpoint—but all of them tend to agree that some form of planning of our natural resources is necessary, and that the intensity of planning effort will increase.

In the following pages, you will read the views of various people involved in this interesting and vitally important field.

COVER: Shows an all too common scene. The soils on these "dream" acres can cause future homeowners serious problems.

- 211 Land use: past and present
by Kenneth E. Grant
- 214 Look at the land first
by Norman A. Berg
- 216 Land use planning viewpoints
- 218 Optimist in suburbia
- 220 The American land
- 222 A rancher's view of land planning
- 224 Land use planning hits home
- 227 Conservation districts in land use planning
by Gordon K. Zimmerman
- 228 Tahoe: planning for a special area
- 230 From the ground up
by Gene Warren
- 231 Land and water planning go together
- 226 Meetings

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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Land Use: Past and Present

by Kenneth E. Grant
Administrator, SCS

America for many years has pursued conscious land use policies at the national, state, and local level, and these policies have had an important impact on the course of the nation's development.

When the first European settler in this country swung an ax against a tree to clear an acre for farming, he was making a land use decision. He did not weigh the long-term consequences of his action, nor did he carefully examine the land use alternatives and their relative impact on the environment.

He chopped away with a single-mindedness that we well might envy in these complicated times, because he was driven by a clear necessity to build a log house and to get in a crop to feed himself and his family.

The desire of individuals and their families to conquer the wilderness and make a living from it dictated many of the early land use decisions. One of these was that the public domain should become a source of national revenue through land sales. During the nation's first 45 years, more than 87 million acres of land were sold, yielding the treasury a substantial amount of money.

There were, however, sharp differences over how to conduct the sales. Big land settlement companies and speculators wanted the land sold in large blocks—to them. Individual settlers wanted the land to be sold in small acreages—to them. In fact, land was sold to both types of customers.

Differences in land use policy also grew be-

tween the East and the West. Eastern industrialists did not want their cheap labor supply to drift West while western settlers wanted cheap or free land and liberal farm credit terms.

But despite the disagreements, there was a strong and growing sense of national destiny during the 19th century that aimed toward taming and settling a whole continent, from the Atlantic to the Pacific. If one could summarize in a single sentence the land use policy of the United States between the landing at Plymouth and the year 1900, it might be: fill it up, connect it up, use it up.

In 1862, the Homestead Act was passed, under which the federal government presented 160 acres of public land, at a nominal fee, to any settler who would live on the land and work it. During the Civil War alone, 150,000 homesteads, involving 25 million acres, passed into private hands. Eventually 1⅓ million homesteads were taken up and carried to completion under this act.

National land use policy also was expressed in our dealings with the American Indian tribes, who were pushed aside in the expansionist rush to settle and farm the whole nation.

One of the first important brakes on America's land policy of expansion and exploitation came in 1891, when Congress empowered the President to set aside forest reserves to protect the nation's timber supplies. Presidents Harrison, Cleveland, and Theodore Roosevelt subsequently proclaimed most of the present national forests.

Preservationist land use policy also was expressed by creation of several national parks to preserve unique scenic wonders and several game preserves and wild bird refuges.

By the 1920's farm problems had begun to intensify. A good perspective is provided by the proceedings of a National Conference on Land Utilization, held in Chicago in November 1931.

Some of the problems discussed at the 1931 conference loom even larger today. Then, as now, there was a lack of rural job opportunities, and one speaker noted that "in some parts of the country, most of the boys and many of the girls leave the farm or town before they are 20."

Several speakers at the 1931 conference called for a federal program for soil conservation. George D. Pratt, then president of the American Forestry Association, said: "Conservation of the soil, I think, can be set down as the first fundamental of both conservation and land utilization."

In 1933, the Soil Erosion Service was established, with Hugh Hammond Bennett as its director. In 1935, the agency became the Soil Conservation Service.

Problems resulting from soil erosion had reached crisis proportions when SCS was created. Overplowing of the Great Plains grasslands led to the dramatic duststorms of the "dirty thirties." Thousands of farms in all parts of the nation were abandoned because their owners believed the soil was "wornout," and some of the finest cropland of the Southeast was eroded and gullied to a point where it seemed impossible to repair.

After a period of demonstrating soil and water conservation techniques to farmers, a successful program of providing technical aid to farmers and other land users through locally organized soil conservation districts emerged. This unique approach

has resulted in land improvement, and changes in rural land use, to a degree almost beyond belief for a voluntary, cooperative program.

By June 30, 1972, more than 2.2 million land users were signed up as cooperators with more than 3,000 local conservation districts. More than 1.7 million conservation plans had been prepared, most of them for farms and ranches, and they cover nearly 600 million acres.

Statistics cannot show the results of this planning as well as an air or auto tour of the countryside, because the soil conservation program has literally changed the face of rural America. A few brief statistics, however, do offer some notion of the scope of change:

Today:

	<i>million</i>
Grassed waterways or outlets, acres	1.8
Contour farming, acres	48.7
Terraces of all kinds, miles	1.2
Stripcropping, acres	21
Range seeding, acres	15

The program also has resulted in remarkable shifts in land use—again, on a voluntary, cooperative basis—from cropland to:

	<i>million acres</i>
Grassland	24
Woodland	2.8
Wildlife and recreation	1.4

In 1956, Congress established the Great Plains Conservation Program, under which landowners make long-term contracts with the U.S. Department of Agriculture to restore their land and establish necessary conservation measures. By June 30, 1972, USDA had contracted with over 42,000 Great Plains landowners to assist in the conservation treatment of over 77 million acres. In the course of the program, over 2 million acres of land were converted from cropland to permanent grassland. Data gathered in 1967 show that about 6 million acres in the Great Plains

need to be converted. A good start has been made.

Programs for crop acreage adjustment and conservation administered by another USDA Agency—the Agricultural Stabilization and Conservation Service and its predecessor agencies—also have had a profound effect on land use in the United States.

This is a very much abridged history of land use—particularly rural land use policy—in the United States.

What is the current picture?

SCS has a pretty good idea, since our agency has leadership in conducting the Conservation Needs Inventory, a national inventory of private land use. The 1967 data tell us that:

Of the 2¼ billion acres of land in the 50 states, about a third is public land owned by the federal government.

Of the remaining two-thirds, about 3 percent is urban and 2 or 3 percent is owned by state, county, or local governments. An additional 2 percent is reserved for American Indians.

The remaining 59 percent of America's land—some 1.3 billion acres—is privately owned rural land that is almost equally divided among the three major uses of cropland, pasture and range, and forest land.

The Conservation Needs Inventory also revealed that while we are fortunate to have abundant soil resources in this country for future needs, more than three-fifths of America's private land is not being cared for to the degree that conservationists feel is necessary to protect the soil for sustained use.

Despite the sizable job remaining, several recent changes provide new hope for sharp gains in soil conservation on cropland. A significant one is the practice of minimum tillage, which has grown from less than 5 million acres in 1964 to about 22 million acres today.

No-till, a form of minimum tillage in which the surface of the soil is not disturbed at all except to drill in the seed and fertilizer, results in the least soil erosion of any conservation practice yet adopted by American farmers.

Today, many people question whether voluntary action alone can solve America's persistent natural resource problems. Iowa has turned to a mandatory program for preventing excessive soil losses on farms. Other states are watching the results carefully as they consider the need for legislative controls over land use and treatment.

Some important natural resource problems will not be solved by technical solutions alone, because they result from conflicts over land use. For example: urban people are turning to rural America in increasing numbers for recreation—including hunting, fishing, water sports, and snowmobiling. To some farmers and other rural residents, this means a welcome new source of income. To others, it represents a disagreeable intrusion and unwelcome competition for rural land.

Many water-resource projects, such as those in the Public Law 566 program, like almost any major works of improvement today, run into local conflicts in land use—conflicts among those whose main interest is agricultural production, or urban growth, or fish and wildlife, or scenic values. The conflicts arise not only during planning, but also after project installation.

A better dovetailing of interests is needed among those concerned with land use planning and those concerned with flood protection. In the absence of any clear guidance in the form of federal, state, or local land use policy, the conflicts can degenerate into lengthy, expensive, and often fruitless debate, or they can



"... he was driven by a clear necessity to build a log house and ... feed himself and his family."

be settled in favor of the most powerful pressure group or economic interest. The result may not necessarily coincide with the long-term best interests of the community or the nation.

The Soil Conservation Service will do whatever it can to help landowners and governmental bodies make land use decisions and policies on the basis of natural resources facts.

Today there is sufficient land in America to meet both present needs and those projected fairly far into the future. With greater attention to adequate conservation treatment, we can stretch our available land resources even further. I feel that we can afford—from the standpoint of national policy—to preserve substantial acreages that have special environmental values, if indeed we can reach agreement on which values are most desirable and most in the public interest.

At the same time, Americans should keep in mind that just as there are places such as Yellow-

stone and Yosemite with unique and special scenic wonders, there also are special agricultural areas with rare combinations of soil and climate. An example is our diminishing acreage suitable for citrus production. Perhaps high-quality citrus land should be preserved for agriculture, just as national parks have been preserved for all the people to enjoy.

SCS technical people, and other USDA employees, are giving an increasing amount of resource assistance to local units of government and various planning bodies. SCS has been drawn into this work for an obvious reason; the soil data we possess and the conservation techniques we practice are as useful to urban and suburban developers and builders as they are to farmers and ranchers.

The "discovery" of soil and water resources as a significant input in conventional urban land use planning has taken place only in recent years. A number of

Continued on p. 219

Look at the LAND First

by Norman A. Berg
Associate Administrator, SCS

The United States is among the richest nations on earth in terms of its land resource. And the future of this resource is in the hands of millions of people who daily make decisions—good or bad—on how it is used.

Over half of the American land is in private hands—owned by individual farmers, ranchers, businessmen, and industry. It is this land that produces most of the food, fiber, and timber we consume and export.

One-third of privately owned land is in forests. One-third is in pasture and range. And a little less than a third is in cropland.

Despite an almost 200-percent increase in population since 1900, these proportions in land use have changed very little. The primary reason is technology. Our crop production per acre continues to exceed our increase in population.

The second largest amount of land is federally managed. This includes 34 percent of our total land area, or 759 million acres, most of it located west of the Mississippi. Of this, 187 million acres are managed by the Forest Service, including 14.5 million acres that have been set aside as wilderness and primitive areas. Timber will not be harvested there.

Much federally owned land is under multiple-use management, and recreation is one of the major uses. With more spendable income, increased leisure time, and greater mobility, the demand for outdoor “sun and fun” use has grown rapidly. Recreation is a possible land use on 447 million acres under federal management, 40 million acres under state control, and 3 million acres in county hands.

Much private land is also used for recreation, especially hunting and fishing. The majority of upland small game finds its home on privately owned farm and ranch lands.

Finally, about 5 percent of the American land is in state or local ownership, while 2 percent is Indian land.

Much of America's land has been well used by its farmers, ranchers, and other landowners. But this has not always been true. Poor land use practices have cost us dearly, both economically and esthetically.

Some farmers still attempt to cultivate soils that are too steep and erosive, or grow row crops on the high risk land in parts of the Great Plains.

Some landowners needlessly burn forests. Some owners or

users contribute to flooding problems for themselves and their neighbors through unwise land use practices. Fifty percent of the nation's annual flood damage comes from small upstream watersheds where both public and private property are destroyed.

Unsightly scars have been created on 2 million acres of land through strip mining and the mine acid that leaches out of the spoil banks and pollutes streams for miles around.

Solid waste is another byproduct of our affluent society. We discard 250 million tons of waste each year. Two-thirds of it goes into 40,000 open dumps, mostly in rural areas where it pollutes air, water, and land.

Animal waste has a serious negative impact on the environment. Large concentrations of beef cattle—feedlots with as high as 50,000 head at a time—produce hundreds of tons of manure a day. This not only pollutes the air, but the runoff can accelerate eutrophication and destroy streams, ponds, and lakes.

By volume, sediment is our most costly water pollutant. About half of it comes from cropland erosion while the other half comes from highways, stream-

banks, public lands, and suburban developments. Sediment yields on a single acre of land can skyrocket from 50 to 25,000 tons a year when land is converted from rural to urban uses—and more than 1 million acres a year are being converted to homes and businesses and roads and airports and reservoirs.

In the next 10,000 days, we will build in and around our metropolitan areas the equivalent of everything we've built since Plymouth Rock. A staggering amount of needless damage will result. Not just from sediment, but also from ignorance of the land's capabilities. Roads, homes, and other buildings will be constructed without checking as to whether the soil is suitable for the type of construction used. As a direct result, many houses will crack or slip downhill, or avalanches will slip down on *them* if housesites are chosen without considering that factor.

The costly and ugly misuse of land is distressing to more and more Americans, because soil and water are national resources. To despoil them is to show contempt for our heritage and an inexcusable disregard for our future.

In many cases, the man in the middle of all this is the farmer or rancher. Unplanned, checkerboard development puts a tight economic squeeze on him that can't be ignored. His land becomes a valuable commodity as suburbia comes closer. His taxes increase and quite often he is forced to sell before developers are ready to build. Then the speculator takes over from the cultivator.

But proper land use planning can help protect and develop natural resources in rural *and* suburban areas.

Soil and water conservation practices can greatly reduce erosion and flooding on agricultural land. Strip mine spoils can be reclaimed and revegetated. Sub-

urban sediment can be drastically reduced by adapting the proved practices that farmers and ranchers have used in protecting their farmland over the past 30 years.

And land capability can be determined long before urban construction work is started.

Americans today are insisting on a high-quality environment where they live, work, and travel for outdoor recreation.

They want attractive homes and new urban communities in an attractive environment.

They want a high-quality food supply at reasonable prices, which means that land use planning must adequately consider

the needs of an efficient and productive agriculture.

And they want space and facilities for outdoor recreation, and for fish and wildlife.

All of these needs should be considered in setting land use policies and making land use plans. The individual and his community have everything to gain if land use is properly planned. They have a great deal to lose if it isn't. ♦



Land Use Planning Viewpoints

Land use policy is a basic responsibility of state and local governments. They are closer to the problems and closer to the people. Some localities are already reforming land use regulations—a trend I hope will accelerate. But because land is a national heritage, the federal government must exercise leadership in land use decision processes, and I am . . . proposing that we provide it.

PRESIDENT RICHARD M. NIXON
Address to Congress
February 15, 1973

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the esthetic harvest it is capable, under science, of contributing to culture.

ALDO LEOPOLD
A Sand County Almanac

With more (land use) controls, we'll fall into mediocrity and people will go to other states like Virginia and New Jersey.

Maryland Beach Area Land Developer, 1973

Conservationists describe the changing attitude toward land by saying that land should be considered a *resource* rather than a *commodity*. But while this correctly indicates the direction of the change, it ignores the crucial importance of our constitutional right to own land and to buy and sell it freely. It is essential that land be treated as both a resource and a commodity. The right to move throughout the country and buy and sell land in the process is an essential element in the mobility and flexibility our society needs to adjust to the rapid changes of our times.

The Quiet Revolution in Land Use Control
Council on Environmental Quality

Instead of laying down an arbitrary design for a region, it might be in order to find the plan that nature has already laid down. One way would be to chart all of the physical resources of the region—especially its drainage network—and see what kind of picture emerges.

WILLIAM H. WHYTE, *from*
The Last Landscape

If planning is to mean anything, then it must be effective; and this means it must prevent some people from doing what they would otherwise choose, or must push others into doing what they would prefer not to do, or both. This country urgently needs forms of land use control, stronger than zoning, that are truly effective, can exert their effects promptly and are democratic in imposition and operation. In my view, one of the best candidates is a new form of public land ownership with some unit of government acquiring land from present owners and serving as the mechanism for transferring the use and control over the land to new owners and users.

MARION CLAWSON, *Resources for the Future, Inc., at the Nat'l. Conference on Land Use Policy, Des Moines, Iowa, Nov. 1972*

Most planners in the U.S. have been trained as urban planners. Most of the comprehensive planning that has been done has been done in urban areas. It is important as we extend the planning process to rural areas and to matters dealing with land and other natural resources to be certain that there is input from those who have the most background in this area.

Statement by the National Association of Conservation Districts to the Senate Committee on Interior and Insular Affairs

In the decade of the seventies, the regulation and control of land use will be extended beyond anything we have experienced in this field to date. . . . To a large extent, the controversy will center on two very practical questions: (1) can private land uses be controlled for public benefits and purposes; and (2) does the owner of open or rural land have a right to a monetary profit, not simply from the productivity of his land and his managerial inputs, but from the unearned increments due to fortuitous location and population growth or movement—urbanization. For land use regulations and controls to be carried out effectively, the first question will have to be answered YES, and the second question NO.

NORMAN WENGERT
*Professor of Political Science
Colorado State University at
the National Land Use Policy
Conference, Des Moines, Iowa
November 1972*

From now on, when we build a road, or a shopping center, or develop a residential neighborhood, we must know precisely what impact that building will have on our environment. In this effort, technical assistance of the kind SCS can provide will be valuable.

GOVERNOR THOMAS J. MESKILL of
*Connecticut, Speech of Nov. 16,
1972*

In developing our land-use pattern, we have paid too little attention to the suitability of land for different purposes. On occasion we build a riverside park or preserve a strip of beach for public use, but generally short-term economics have governed land use.

STERLING BRUBAKER, *from
To Live on Earth*

We are confronted with insurmountable opportunities.

POGO

A builder's code for conserving natural resources

Prepared by the former Douglas, Nebraska, Soil and Water Conservation District—

1. Choose the land that has suitable natural drainage and soils for the intended development.
2. Waterways and flood-plain land should be considered for park and other open-space uses.
3. Save natural vegetation and trees wherever possible.
4. Plan for the safe disposal of increased runoff caused by rooftops, pavement, and straightened waterways.
5. Plan streets to fit the contour of the land, avoiding long stretches of steep grade.
6. Provide adequate drainage to and from streets, to storm sewers or other runoff disposal practices that do not erode the land or inundate property below.
7. Hold the amount of land area graded at any one time to a minimum and stockpile the topsoil for reuse in preparing the final seedbed.
8. During and after grading, plant a temporary vegetative cover which will protect the bare soil surface.
9. Construct sediment basins to remove sediment from runoff waters during development.
10. Install drainage structures and plant permanent vegetation compatible with future turf as soon as possible.
11. Obtain technical assistance from the local conservation district on any of the above items, if needed.

Optimist

in

Suburbia



Seventy percent of all Americans live in urban or urbanizing areas. One rapidly growing area is Fairfax County, Virginia, adjacent to Washington, D.C. Already home to half a million people, its continued growth has spawned environmental and land use planning problems.

Mrs. Jean Packard is chairman of the Fairfax County Board of Supervisors. A longtime conservationist, she has been chairman of the Northern Virginia Soil and Water Conservation District, president of the Northern Virginia Conservation Council, a director of the Conservation Council of Virginia, and a member of the Fairfax County Human Relations Council. She was interviewed by a member of the Soil Conservation Service Information Division.

Mrs. Packard, what are some of the environmental and land-use problems associated with development in northern Virginia?

Our streams are being destroyed by development; we're losing our topsoil to development; we're paying a terrific price to refurbish our parklands, which are being destroyed by silt that flows down from uncontrolled development.

As an example, Fairfax County had asked the Northern Virginia Soil and Water Conservation District to comment on a specific zoning case that was coming up.

It was about 50 acres of very difficult land. About 17 percent of it was flood plain, and it had a high water table and a beautiful stand of hardwood, one of the prettiest stands in the county.

The developers wanted a tremendous complex of about 10 buildings, 10 to 14 stories high, and two layers of underground parking on this land. As to the watershed drainage, they intended to take the small stream on the property, put it into a pipe, tunnel it under I-66, the southern boundary of the property, and then just turn it loose into a little stream that feeds down into Lake Accotink, which is a county park.

The little stream is in bad shape already because of the construction that's going on. It's been badly damaged. The developer was going to take this huge volume of water to the end of the subdivision property and just dump it—all the velocity from all this runoff—with no thought of what would happen when it reached Lake Accotink, which was purchased with taxpayer's money and must be maintained by taxpayer's money.

The taxpayer pays for bad development?

For all development. People in Fairfax County have been led to believe that when we grow, we keep our tax base down. Well, we've been growing—skyrocketing—and our tax rate has been increasing faster than our popula-

tion. The costs of everything—government services, public facilities, the public service areas—the total cost of government, *everything* increases at a faster rate than your population increases.

What's the answer? To stop growth?

You don't want to stop all growth. And if you did want to, you couldn't.

How can development be controlled?

Planning. Your planning should be on the basis of natural boundaries, such as watersheds, which would make far more sense than an arbitrary political line that's drawn on a map somewhere. The first place, the easiest place to effect this is locally.

In planning, what should be the relationship between population and resources? What are the guidelines?

There aren't any; this is our problem. If we want to take a long-range viewpoint, I think human population and land use should relate on the basis of the carrying capacity of our natural resources.

People move out to a beautiful area like Fairfax County because of the natural amenities—the streams, the trees, the grass—and then sit helplessly and watch the city engulf them. Now, at some point, someone's got to say "Stop! No more!" I want to say that "Stop!" before everything's destroyed.

Mrs. Packard, at one time you were chairman of the local soil and water conservation district, so you're well aware of what districts do. What do you see as their role in an urbanizing area?

I see the role of the conservation district in areas such as this as assisting citizens to protect their own environment. This is particularly needed because there is a natural, built-in inclination in most local governments towards growth and development.

How did you first get involved in soil conservation work?

In 1966 I was with the Land Use Planning Committee of the League of Women Voters, and the committee started to take a look at the siltation and erosion problems accompanying the county's tremendous growth.

With the help of the district and the SCS district conservationist, I put together a slide show on erosion and sediment problems in Fairfax. For a solid year the League of Women Voters devoted themselves to speaking on the subject any time three people gathered on a street corner. We talked to government officials, civic organizations, builders, the planning commission, anybody who would listen. We gave them the straight horror story of what was actually going on. We impressed this upon enough people, and we got an erosion control ordinance.

Obviously, you feel that women can be effective in working for a better environment.

Women can be invaluable. They are attuned to environmental problems; they see what happens out of their back window. They're involved because of their children. And, of course, much of the volunteer work in an area like this has to be done in the daytime, when the county government functions and the public hearings are held. Consequently, women who are not holding down full-time jobs are invaluable for this work.

Finally, you've made some pretty grim statements. Are you hopeful or pessimistic about environmental improvement and better land use in urbanizing areas?

I'm the greatest optimist you'll ever want to know, because I've seen the tremendous changes that have taken place here in the last 10 years, and I've seen what can happen when you tell the people what goes on and they act on it. ♦

Continued from p. 213

events have contributed to this new awareness:

—Suburban sprawl and the growing demand for open space for recreation and esthetic uses.

—The Federal Flood Insurance Program, which requires that communities institute flood plain zoning in order to participate.

—Diminishing ground water supplies, which have demonstrated the importance of keeping ground water recharge areas free from development.

—The destruction caused by mudslides and erosion as a result of building on steep hillsides.

—The nuisance and health hazards caused by increasing numbers of malfunctioning septic fields.

—The rapid development of the "second home" and "lakeshore development" business.

Many agencies, at all levels of government, are working hard to translate this new awareness of soil and water resources into intelligent land use decisions.

My personal involvement in the soil conservation movement has given me enormous respect for the recuperative powers of the American land. There have been many land use changes in this country, some productive, and some which seemed disastrous at the time. But so far, we have survived the mistakes, and, in most cases, we have learned to correct them. In many cases we have improved on what was here when we settled this country.

We Americans have done a lot of things right, as well as some things wrong, in our use of natural resources. If we now plan intelligently, using information and knowledge acquired from both the successes and failures of the past, there is no reason why we cannot continue to make this country a desirable and productive place in which to live. ♦



What is this American land that so



It is roughly 3,000 miles wide, not including Hawaii—although that may be our most beautiful state. It is 1,500 miles North and South, not including Alaska, although that is our biggest state.

It is 3,615,122 square miles of land and water on which 210 million Americans have produced, side-by-side, the world's greatest industrial and agricultural economies.

It is woodland and grassland and bone-dry deserts and green mountains and ice-covered tundra and tropical rain forests. It is bounded by the biggest freshwater lake on earth and contains the largest single area of rich productive farmland in the world. It is sprawling cities and growing suburbs and endless miles of corn and wheat and cattle.

Its agricultural abundance feeds not only its own people but some of the rest of the world as well.

But there are problems with the American land.

The problems are polluted air, dirty water, misused land, and the disposition of the wastes and other excreta of our 20th century way of life.

The problems are the use of soil and water as expendable products to be dirtied, used up, and thrown away, a process that ignores their innate qualities. The problems are "planning" for people, in which the real needs of people



many people are planning for?

are not fully met. The problems are compounded by the old and unattractive human qualities of greed and ignorance and fear.

The American land can be changed for better or worse. A "dust bowl" region of gullies and gritty wind can become a beautiful sight of blue skies and miles of tall, productive yellow wheat. A scrubby rangeland can return to sturdy green grass. A hot, treeless prairie can grow ash and Russian olive and other trees to protect people and wildlife, add beauty, and hold the soil.

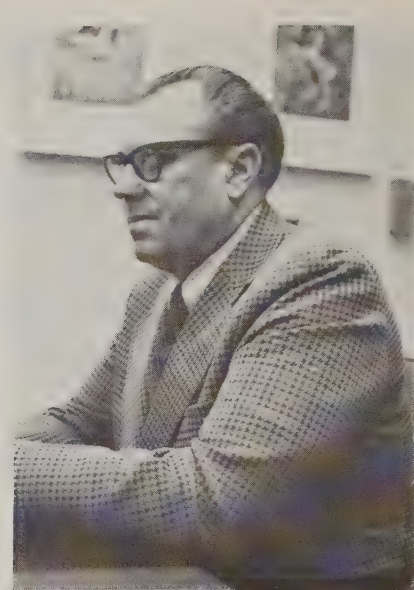
All of this has happened to America in the 20th century.

Less happily, a fishing stream can become a mudhole, or a tree-covered mountain can be stripped to resemble the scarred backside of the moon. But even then, it is in our history and our character to believe they can be restored, and to act on that belief.

The American land has present problems and future possibilities that are the rightful concern of planners. We must all deal with blueprints, and cost-benefits, and thick books of statistics that slice and weigh and measure the components of land and water for our various uses. But in the process let us also remember to look at the land whole, to enjoy its beauty, and to seek an understanding of the people that it serves. ♦



A rancher's view of land planning



William E. Richards, of Harlan County, Nebraska, is a banker and rancher who feels that "land use planning, like planning your day-to-day living, is a continual process."

Richards, who began as a tenant farmer, calls his 5,000-acre ranch "Nip and Tuck," reflecting the uncertainty of his earlier years. A Great Plains conservation cooperater since 1959, he is active in local civic and educational affairs. He was interviewed by Robert Buis, SCS information specialist, Lincoln, Nebr.

Bill, from a conservation farmer or rancher's viewpoint, how important is wise land use to his future or to the future of the community?

It's very essential. We have only so much land. If we are going to support an increased population and feed our people at the standard of living we now have, it is absolutely essential that we preserve this land and use it wisely for the generations that come after us.

Do you feel that one individual's land use decisions affect the total community?

Yes indeed. Especially if that individual embarks on a program or a new idea that everyone else has thought about but no one has actually put into effect. I am

thinking, for instance, of parallel terraces. After they had been done here a couple of times, they caught on and really influenced the whole area.

The effects of a conservation plan don't stop right at the property line. They very often extend beyond, and it's important that one farmer cooperate with his neighbors and maybe even come up with a pooling of resources to extend the farm plan beyond his borders.

Do you need much land use planning for cropping and grass systems?

Oh yes! A farm plan gives the landowner a complete and detailed inventory of his land and water resources. Add to this the proposed cropping system, and you get a suggested land use plan consistent with the proper use of land. This is highly important in our area, as we have several different types of soils, a varied topography, and considerable differences in degree of existing erosion.

How is the water situation here?

We are fortunate in having an abundance of underground water. But we cannot afford to mine it. To make efficient use of the water, we must know the soil's capabilities for absorption.

If a field isn't suitable for row-cropping, do you put it back into grass?

Yes. Our ranch was put together by the purchase of many single units. Over the years, as we purchased adjoining areas, the first thing we did was ask for a soil survey and planning assistance through our local soil and water conservation district. Very often we found that parts of each farm were wholly unsuited to continuous cropping. The first thing we did on those areas was to shape the land where needed and reseed it back to some kind of warm-season grass.

Along with your crops, do you have a livestock operation?

Yes, rather extensive. We run both a cowherd and yearlings and in addition have a fattening program.

How does land use planning fit into a livestock operation?

The first thing you have to know is the stocking rate of your range. That means not just to eye-ball the land but to actually get a range survey of the plant population, the kinds of grasses, and a projection as to the number of cows that it will carry.

Secondly, there may be an area where you can profitably combine the use of native grass pasture with an irrigated grass pas-

ture. This has been exceptionally beneficial because in doing this we have increased the amount of grass on our native ranges—through letting it rest—and at the same time utilized some otherwise rather poor land for irrigated pastures.

Bill, you are a rancher, a civic leader, and also a banker. From the banker's viewpoint, how important is land use planning?

The first thing a banker looks at in any loan is the collateral. In most instances in our area the collateral will be land or at least land as a base. Anything that we can do, or the borrower can do, to increase the value of that base will make the loan more secure. As a banker, I am interested in what the borrower does with his land. If we, as bankers, can steer him to the right place to get conservation help on his farm or ranch, this is the first thing to do. It may seem selfish, but it's nevertheless true.

In other words, if you lend money, you want to lend it on good collateral?

And the best collateral is land that's been taken care of.

We have talked about general land use planning. What is an example of a personal land use decision you've made on your ranch that has paid off?

Well, there were a number of areas on our ranch where irrigation and floodwater drained off the land down into creeks. These were mostly dry creeks which flowed only during floods or periods of irrigation. For years I had eyed these particular drainageways with the idea in mind that we should dam them up and make irrigation water re-use pits out of them. We did this, and I can truthfully say today that we recycle from 50 to 60 percent of all the water that falls on our ranchlands. It's either recycled back through our irrigation system or held in reserve areas in ponds.

Sounds good. Were there any other results?

Oh yes. Water going down the old drainway had caused a huge gully that was undermining an expensive concrete road structure. In cooperation with the county and the township, we regraded the road and it became a dam or storage area. This drastically cut down the county maintenance costs. Benefits to the county and the township far exceeded the costs.

In addition, some of the reserve water pits are large enough for fishponds and I plan to stock them. They will be very pretty when we plant shrubs around them. So we get good water reuse, a reduction of county costs, and a nice fishing area, all from that one change in land use. ♦

From the ground up

Continued from p. 230

which makes a big dollar difference in initial construction and maintenance costs.

Elsewhere, the city of Shreveport has asked the Soil Conservation Service for a special soil survey on 42 city park sites. City officials also are using the soil survey to plan improvements in road locations and picnic areas. And, the survey is useful in locating wet spots and areas where certain grasses, shrubs, and other plants will grow best.

A 2,000-foot strip around Toledo Bend Lake, which borders Louisiana and Texas, has been surveyed, and the data are being used by the Louisiana Department of Public Works and developers in the area to locate roads, homes, and other construction sites.

Soil surveys are made by walking, or driving, over the land and digging, or drilling holes to determine texture, depth, and color. Soil scientists look at slope, wetness, soil dryness, and amount of erosion. They also check the kind of vegetation in the area. These data are then plotted on an aerial photograph.

Soils are named according to a recognized international system. There are about a thousand different soils in Louisiana and more than 70,000 in the United States. After the soil is named, a description is written for each soil type.

Over 8 million acres of Louisiana have been soil surveyed. Surveys have been completed in 14 parishes, and published reports are available in six parishes. Soil scientists, who make the surveys, also help to interpret them. Help is also available on erosion control and water management on problems within cities.

Why all this interest and concern about the soil? For one thing, as people crowd into urban centers, the choice building sites become scarce. Planning commissions and city governments are recognizing conservation and land use problems and want solutions. They know that people want many things from the land, but few know how to plan and use it rightly, or have much information on its limitations and potentials.

As Farmerville's Mayor J. G. Elliott says, "Our town is going to grow in some direction. If we know about the soil and its limitations, we will grow in the right direction and with less expense." ♦

Land use planning

hits home



Good land use planning is the farmer's bread and butter. But it affects the daily life of suburbanite and city dweller as well. The following examples of good and bad land use planning among the concrete and condominiums can be duplicated in every state. Therein lies the problem and the challenge.

Poor land use planning can put your basement ankle-deep in muddy water. It happened in Delaware County, Pennsylvania, where the architect called it "a bad soil and water problem. We just didn't know about it." But the county had a 10-year old soil survey, and the information was available to builders before they built.

Poor land use planning can mean you face—or file—a lawsuit. City officials of Falls Church, Virginia, were ready to sue the owner of a vacant lot after heavy rains washed large quantities of his bare, eroding soil into nearby streets and sewers. The city had to buy a special cleaning machine to open the clogged-up drains.

Poor planning can make you sick. A Wisconsin nurse went to visit several young children who were home with a mysterious illness. As she parked her car, she spotted a wet, smelly area on the lawn. The sewage had backed up and overflowed—and children were playing in the area! The homes were built on soil that was slow to absorb septic tank effluent. Several families had to sell their homes and move.

Poor land use planning can wreck your house. It's happened to numerous homeowners, including the man in the picture, who built a home on unsuitable soils.

Poor planning wastes tax money and puts a higher price tag on community services. A town near Detroit, Michigan, added \$200,000 to a construction job because its new water main went through a 600-foot wide area of deep

peat soils. It could have gone through normal mineral soils nearby at less cost.

A New York town paid \$235,000 more than it had planned for a sewer system because of a miscalculation in depth to bedrock caused by unrepresentative test borings. An hour's study of the county soil survey would have shown that some soils along the sewerline were less than 20 inches to bedrock.

And, citizens of a Colorado community were taxed to build a new \$2.4 million schoolhouse. Six years later, the walls had buckled, the ceiling had fallen, and the building was condemned. The school was located on unstable soils. More than a million dollars have now been appropriated for repairs, but engineers are doubtful that repair is possible. But—planners could have looked at the soils more closely before authorizing the building.

Poor land use planning by your neighbors can cause *you* problems. Upstream construction in the watershed above Lake Barcroft, Virginia, eventually added huge deltas of mud to the lake and cost the homeowners "mud money." Lake Barcroft citizens—who had not caused the problem—spent thousands of dollars to maintain the silt traps that kept it clean.

Urban pressures on land use can raise food prices and lower food quality. Urbanization is crowding the avocados, artichokes, and other specialty fruits and vegetables out of some areas where soil and climatic conditions are particularly well suited to them. Most of the crops can be grown elsewhere, but costs may be higher (so will retail prices) and the taste and quality less desirable. And, while most land can easily go from artichokes to apartment houses, you cannot reverse the process without great expense and difficulty.

Poor land and water use planning can ruin water supply reservoirs. It happened years ago when soil erosion silted up this reservoir (see picture)—and it continues to occur.

Finally, poor land use planning can mean ugliness and landscape deterioration. And that hardly needs documentation!

GOOD LAND USE PLANNING—and implementation of the plans—can save you tax dollars. The soils in a strip of Illinois land under consideration for a new highway were very poor for building. Local planners chose another route instead, and saved over \$800,000 in excavation and construction costs.

And, San Antonio, Texas, engineers discovered that parts of their city were underlain with a special soil that triggers an electrochemical process which destroys metal. Under-



ground utility pipes going through this soil corrode in a few years. So, San Antonio officials check the soil maps, then place their utilities as far as possible on "normal" soils.

Good land use planning and implementation can protect your water supply. Lake Johnson is a major source of water for Raleigh, North Carolina. A large apartment building was proposed for the area. An SCS study found there was a good possibility of serious damage to the water supply if the apartments were built as originally planned. The study indicated that no development around the lake was preferable, but if unavoidable, soil conservation building methods would reduce sediment runoff from the area by 90 percent. The builders have promised to follow these methods if city officials okay the construction.

Good land use planning means not having to say you're sorry when you finish building a home. It means knowing what a flood plain is; building on soils that will support your home (no shrink-swell, no future landslide); understanding why you can, or can't use a septic tank sewage system, dig a satisfactory pond, or plant grass that grows.

Local planning boards increasingly are using basic natural resource information. Some of the tools are flood-plain facts, soil survey maps, and legal requirements for controlling soil erosion during the building process. During 1972,

more than 26,000 state or local government agencies asked the Soil Conservation Service for help with natural resource problems.

Good agricultural land use planning can provide more food from the same, or fewer acres, thereby releasing land for other uses. Cattleman Dan S. Budd of Wyoming used a conservation land use ranch plan, and doubled the "output" of his ranch. Land which supported 350 cattle before he implemented his plan now supports 650 cattle.

And, good agricultural land planning means better use of the nation's land. Corn is not a good crop for hilly land—it's too erosive, too "hard" on the soil. From 1919 to 1972, the acreage planted to corn nationwide decreased, but corn production rose greatly—it more than doubled—because average yields were much bigger. At the same time, corn acreage in the South Central States, where hilly terrain and longtime erosion problems make much of the land better suited to trees or pasture, dropped sharply, from 24 million harvested acres in 1919 to only 3 million harvested acres in 1972.

Good land use planning means more, and more convenient, parks, lakes, bike trails for people. SCS District Conservationist Herbert Boe, of South St. Louis, Minnesota, helped a developer with a housing plan for 100 acres. At Boe's suggestion, the developer changed the original plans to provide future homeowners with three ponds, a park area, a 5,000-tree shelterbelt, plus more trees and shrubs for beauty and soil erosion control.

Good land use planning means more wildlife to hunt, photograph, or enjoy. Farmers and ranchers have changed more than 9 million acres of land from crop use to recreation and wildlife. They've improved wildlife habitat on

nearly 30 million acres of upland and nearly 4 million acres of wetland. They've built nearly 2 million ponds. More and better fishing and hunting are two results.

Good land use planning brings beauty. The planned new communities of Reston, Virginia, Jonathon, Minnesota, and Columbia, Maryland, are suburban examples. Well-kept farm fields, green pastures, and clear lakes and streams are rural examples.

Finally, advance land use planning will help meet national needs for

- good homes and new communities
- adequate supplies of food and water
- desirable and convenient recreation areas
- the preservation of some

areas for wilderness and solitude

Dr. Kurt Bauer, director of the Southeastern Wisconsin Regional Planning Commission, said, "We envision an increase of 900,000 people in our seven-county area in the next 25 years. If development were uncontrolled, we estimate that 410 square miles would be converted from rural to urban use in this period. If our plan is followed, however, the same number of additional people could be accommodated in a comfortable density in just 200 square miles."

America has enough space—enough natural resources—to meet its future needs, if the American people are good stewards of the land and plan its use wisely. ♦

Meetings

June

- 3-6 National Watershed Congress, Wichita, Kans.
- 3-7 General Federation of Women's Clubs, Baltimore, Md.
- 4-6 Third Annual Conference on Pollution Control in the Marine Industries, International Association of Pollution Control, Montreal, Canada
- 7-11 National Audubon Society, Denver, Colo.
- 10-13 Workshop on Environmental Problems in the Extractive Industries, sponsored by the Geological Society of America, Society of Mining Engineers of AIME, and Water Management, Dayton, Ohio
- 10-15 Outdoor Writers Association of America, Grand Rapids, Mich.
- 11-14 International Symposium on Remote Sensing and Water Resources Management, Burlington, Ontario, Canada
- 17-20 American Society of Agricultural Engineers, Lexington, Ky.
- 17-22 Ecological Society of America, Amherst, Mass.
- 17-22 American Institute of Biological Sciences, Amherst, Mass.
- 18-20 American Plywood Association, Gearhart, Oreg.
- 20-July 4 American Association for the Advancement of Science, Mexico City, Mex.
- 23-26 Ecology Council of America, Catoctin Park, Md.
- 24-28 American Seed Association, Atlanta, Ga.
- 24-28 National Federation of Business and Professional Women's Clubs, San Juan, Puerto Rico
- 24-30 National Environment Health Association, Atlanta, Ga.
- 25-29 Air Pollution Control Association, Chicago, Ill.

The role of conservation districts in land use planning

by Gordon K. Zimmerman

Executive secretary

National Association of Conservation Districts

For almost 40 years, soil and water conservation districts have advocated two basic environmental principles: use land within its scientifically determined capabilities, based on soil surveys and their interpretations, and treat land according to its needs for protection and development.

These principles were put into practice on individual farms and ranches, through the personal responsibility of farmers and other landowners, and with their voluntary cooperation.

Then, some larger natural resource needs and problems became apparent and soil conservation districts became involved in farm forestry, flood control work, and the economic development of their areas.

Today, even broader needs are evident. In 1973, people are interested in protecting and improving nothing less than the entire natural environment. They want clean air and water, suitable places to dispose of solid waste, better outdoor recreation areas, better water supplies, and a generally better environment. They want, in short, what only orderly land use planning can bring.

Conservation districts have some unique assets that qualify them for an important place on the land planning team. District

supervisors know the physical land and water facts of their area. They know the people in their area. And they know the needs of these people. Many district supervisors rightly feel they have a clear responsibility to participate in local land use planning.

Districts can provide land use planning groups in their area with data on natural resources, their views on critical land and water problems and opportunities within the district, and the principal purposes for which land should be planned, as the district sees them.

Districts should request the opportunity to review, from the standpoint of responsible laymen and local resource officials, any land use plans involving the district that are prepared by any planning group or agency. As a corollary to this, the district should have the opportunity to make recommendations with respect to any plan.

Districts can and should initiate land use planning, at least in an elementary form, for those areas where no planning has been done and where valuable resources are being jeopardized as a consequence.

Much current land use planning stops at the city limits. Much of rural America does not yet have the benefits of detailed plan-

ning work. Districts are in a position to make a significant contribution in these areas, as well as in areas where comprehensive planning is already underway.

But, district people should be aware of at least two major, emerging problems associated with land use planning.

First, the question of so-called human or social "rights" versus traditional property "rights." If the pursuit of economic development continues along the traditional lines that are largely determined by private initiative—and if this conflicts with the general public's interest in a healthier environment—then how should the desirable direction for future resource use and economic development be determined?

And second, who should make important resource decisions? Should it be local people and local governments, who are the most immediately concerned, or should it be people farther away; those presumably, with a more objective view of the interests of society as a whole?

Who determines the public interest? And, if a distant body is authorized to act in the "public interest," what will happen to American democracy? ♦

Tahoe: planning for a special area

Beautiful sky-high Lake Tahoe—22 miles long and 12½ miles wide—is noted for its crystal clear blue waters and its breathtaking mountain scenery.

But recently, the lake has been threatened with various forms of pollution, while the surrounding five-county California-Nevada Tahoe basin area has had land development problems that could change its legendary beauty into landscape blight.

In 1970, many years of concern for the unique environmental qualities of the area led to establishment of the Tahoe Regional Planning Agency. Its director is Richard M. Heikka.

The agency's charge is to provide for the kind of planning, conservation, and development that will accommodate the legitimate needs of people without destroying the environment.

The agency has both planning and regulatory functions, with ordinances covering land use, grading, and subdivision and shoreline areas. A unique feature is its land capability districts, in which areas are rated according to an "environmental sensitivity" scale of one to seven, based on soil types, topography, and other natural features. This determines

the percentage of land that can be disturbed by development.

In 1971, The Soil Conservation Service and the Forest Service (on forest lands) completed the mapping for a Tahoe basin-wide soil survey. The information was incorporated into the Regional Planning Agency's land capability guides.

Recently, Soil Conservation Service's Resource Conservationist Leonard A. Anker talked with Mr. Heikka about the work of the agency. Excerpts from Mr. Heikka's remarks follow:

On the Lake Tahoe plan. "The Tahoe plan is heavily based on environmental data put together by many agencies and . . . the Soil Conservation Service input on soils has become a very integral part of the animal we finally called the land capabilities map. This is a look at the land-form, with heavy emphasis on soil information. Additionally, we had inputs dealing with geology and vegetation and a great deal of other data assembled by state and federal agencies and by volunteer workers. We estimate that if we had to go out and contract for this, starting fresh, we'd probably have \$2 million worth

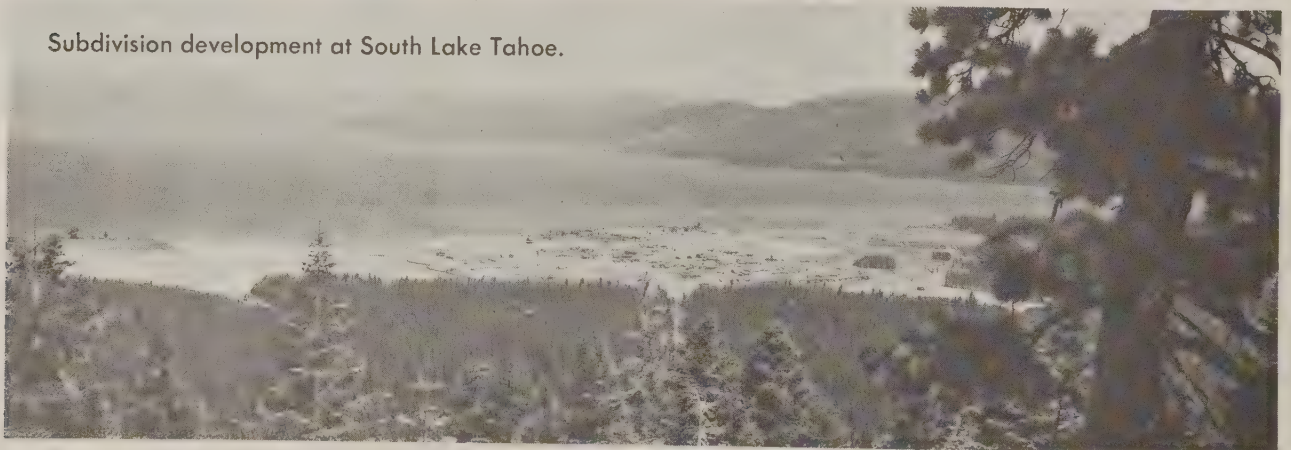
of data to put together—and that's a conservative estimate."

On the use of soil information. "Our land use regulations deal with land use districts. Based on the technical interpretation of the soils data, we platted restrictions on land coverage and the amount of disturbance allowed at any given site. This is totally related to the soils classification as a major input in the land capabilities map, which is included right in the ordinance. It's really the basic way in which we have identified what we think is the very sensitive and fragile environment here at Lake Tahoe.

"This has resulted in severe restrictions on land development practices. As an example, a typical residential development even in our best soil capabilities area is restricted to a 30 percent disturbance factor. Until a few short years ago, this was unheard of in residential developments.

"We also use soil information in locating flood plains. Certainly we use some of the traditional U.S. Army Corps of Engineers flood-plain data, but we also look at the basin from the standpoint of stream environment zones. Normally these will not only include the flood plain but the

Subdivision development at South Lake Tahoe.



riparian vegetation as well. It's important to know this from the standpoint of maintaining wildlife habitat in wetland areas."

On legal aspects of enforcement. "Interestingly enough, everybody assumed we would be overwhelmed in the courts in any lawsuit. In fact, we've picked up something in the nature of \$220 million in claims for inverse condemnation. This came about because, based on a solid foundation of environmental information, we made some severe cut-backs from the traditional zoning that had existed earlier at the local government level.

"But the only area of ordinances that has even come under questioning so far has been the land use ordinance. The only completed case to date was a class action suit against us, which went into federal court and was successfully defended by the agency.

"We are routinely enforcing provisions of the grading, subdivision, and shorelines ordinances, using the misdemeanor provisions of the agency's law and effectively obtaining legal action where necessary. Actually, we were amazed at how little problem we had."

On protecting Lake Tahoe. "We have to appreciate that there's been a hundred years of abuse in the basin. In most cases it was abused without people realizing what they were doing. The purpose behind our program is to cut down on the rate of eutrophication of the lake. We're optimistic that we've turned the corner."

On erosion and sedimentation in the Lake Tahoe basin. "The experts tell us that Lake Tahoe, which is probably second only to Crater Lake in its purity and clarity, is subject to a loss of that clarity from three factors: liquid waste, solid waste, and sedimentation. We have fairly effectively controlled liquid and

solid waste disposal through ordinances. About 85 percent of all sewage is now exported from the basin, and we expect that within 2 years all sewage will be exported. The opinion now is that if we can effectively control (soil) erosion in this basin we can effectively guarantee the clarity of Lake Tahoe for future generations. So sediment control is very critical, and a major thrust in virtually all our regulations is tied to this aspect."

On controlling man-caused sedimentation. "We use the land capabilities map in reviewing sediment control plans. But we have gone further and created an informal development review committee of resource experts in the various disciplines. Certainly an integral part of this (group) are the SCS people who are participating in this review and giving us their technical help on specific development plans.

"We've identified a great deal of land in the basin as having a principal and primary function of watershed protection and its broader implications of protecting the special qualities of Lake Tahoe. There's no question in our minds that for many of the lands, both public and private in the basin, this will be its only use."

On the agency's shoreline erosion control regulations. "We have begun, through our studies, to identify man-caused problems along the shoreline, and the ordinance is designed to correct or solve these. This is a tough one. There is little precedent for the nature of the regulations we're developing. We expect to have some very interesting times with specific development proposals over the next year."

On revegetation plans for developing areas. "We have very shallow soil mantles here. Where there is some disturbance such as road cuts we are requiring immediate revegetation.

"We've developed a design guide which is now in the final throes of adoption. The wonderful thing about the Tahoe Agency is its ability to move out of the realm of research into the realm of regulation. We desperately need more research, and as we get it we will build it into our normal operating posture."

On agency relations with the Soil Conservation Service and Forest Service. "I think we've probably received far more help (from USDA) than anyone could have anticipated earlier—it has really been a joint effort. What we now see developing is a continued cooperation that will, hopefully, be a two-way street, wherein the soils people will have the opportunity of acknowledging a new interpretative approach to soils data. I would guess from this point forward we will offer a great deal in the way of information as to how we use this help and, hopefully, expand the opportunities for the Soil Conservation Service (to do this kind of thing) elsewhere in the country."

Final comments by Mr. Heikka. "We've got a charge from Congress to protect a very fragile environment, yet on the other hand provide for the orderly use of the lands in the basin by man. It's a tough challenge, but all of our information and work has been focused on this attempt. While we may not have a perfect solution, I think that we are further down the road, comparably, than any other planning agency in the United States in really understanding the limitations of the environment as a basis for planning. We see this as a springboard for the broader national program that certainly is coming." ♦

From the ground up

by Gene Warren

Public information specialist, SCS
Alexandria, Louisiana

About 48 percent of the entire United States has been soil surveyed—a larger percentage in populated regions. Survey information, including interpretive help, is available from local conservation districts, local or state SCS offices, state or federal (USDA) extension offices, and some local, regional, and state planning agencies.

Here's how town and city officials in one state are using this information.

More than 200 towns, cities, and other units of government in Louisiana have turned to their soil and water conservation district and the Soil Conservation Service for help in solving conservation problems. This is a big change from a few years ago when conservation work was mainly done on farms.

A major form of help is soil survey information. A survey is a tool for learning about the soil—its capabilities and limitations. It can help farmers, land devel-

opers, engineers, road builders, planning commissioners, and others to cut building costs and to plan the land's best use.

Springhill, for example, has a soil survey covering land in and around the town. Mayor James Allen says, "This information tells us that some soils around here are poor for constructing buildings and roads. On the other hand, it shows good areas for homes and land development. We use the soil information to develop our city plan, and I am proud it was done right."

DeRidder is another town that is doing things right. The city and the Beauregard Parish Police Jury entered into an agreement with the SCS to have a special soil survey made for 30,000 acres. DeRidder Mayor Frank Delia says of the completed survey, "This helps us to pinpoint soil problems as we expand our sewage system. The survey is going to be a big asset to builders, businesses, and industry."

In and around New Orleans, SCS has soil surveyed 50,000 acres of land that may eventually undergo development. The Jefferson, Orleans, St. Bernard Parishes Regional Planning Commission paid half of the costs.

Almost all areas around New Orleans that are still available for building have soils with severe limitations for use as homesites. But, among the soils with severe limitations, some are less severe and cost less to develop than others. The survey discriminates between them.

Some soils around New Orleans, for instance, will require friction pilings 30 feet long to support a home foundation, while no pilings at all are needed to support the same weight building on other soils. Some organic soils sink away at a rate of about 1 inch per year with broken sidewalks, driveways, and foundations as a result. Which soil is

Continued on p. 223



Soil scientist working near Alexandria, Louisiana.

Land and water planning go together

Modern land use planning recognizes the vital relationship between land and water. The water conditions of an area—frequency of flooding, annual precipitation, ground reserves, concentration or disposal of runoff—often determine the land uses that are possible or desirable.

Altering water conditions can have a major effect on land use. Small watershed projects are an example.

Watershed projects protect land from flooding through engineering methods (small dams, improved water courses) and through helping to “keep the raindrop where it falls” by good soil conservation methods above the dams or reservoirs.

If the protected lowlands are converted to a more intensive agricultural use (and this may happen, because they are often more fertile and level), then the steeper uplands in the watershed can be converted from crops to pasture or woodland or other less intensive and often more suitable uses.

If the newly protected lowlands are already in urban use, a watershed project can help prevent the flooding of homes and—if planned this way—can often provide the town with a new source of municipal or industrial water. This offers the town a chance to improve its community facilities or to expand its industrial base.

Again, if planned in advance, many watershed projects can provide water-based recreation or improvements in fish or wildlife habitat.

Finally, in the course of planning a watershed project, the sponsors collect a great deal of

pertinent hydrologic and soils data. This can help local planners to solve other natural resource problems.

Hurricane Agnes, in June 1972, caused billions of dollars in flood damages to states along the Atlantic seaboard. But the town of Wellsboro, Pennsylvania, stayed dry and avoided an estimated \$10 million in flood damages through protection afforded by the Marsh Creek Watershed Project.

Flood protection for the area was only one effect on the land. All three project lakes provide fishing; one provides for boating and picnicking, and another holds a large municipal water supply for Wellsboro. Local residents claim that the watershed project, by providing flood protection and better water supplies, has been a major catalyst in improving the area.

During the period of planning and building the project, the community purchased the local water company, installed new street lights, and rebuilt the main street. In addition, several companies expanded, new jobs for local residents opened up and—partly due to the new lakes—the area is growing as a popular all year round tourist spot.

Culpeper is a progressive Virginia town. But periodic floods used to wash away much of the progress. Floodwaters damaged roads, homes, and stores and put the sewage disposal plant out of commission. The same floodwaters removed topsoil and ruined crops on surrounding farmlands.

Between floods there were dry spells. Twice the town's main

water source, Mountain Run, went dry.

The Mountain Run Watershed project started 19 years ago. Today five dam-created lakes and intensive soil conservation work on surrounding land mean protected farms, flood control in Culpeper, more water for municipal and industrial use, and Culpeper's first park, centered around one of the lakes. A dozen new industries or businesses have arrived, assured of ample water supplies; a new hospital has been built, and the town's population has more than doubled. The watershed project has received widespread community backing.

The city of Warrenton, Georgia, had an insufficient water supply for growth. City fathers joined their rural neighbors in the Rocky Comfort Creek watershed area and made comprehensive plans for better water use in the area.

The results were multi-use reservoirs for both flood prevention and increased municipal and industrial water supplies. This permitted sewage oxidation ponds to be built with assurance that sewage lines could be extended. A sizable amount of water was also stored for development use.

Ed Ricketson, chairman of the Central Savannah River Area Planning and Development Commission, says that “because of this watershed project, we now have an almost unlimited supply of water. This has allowed us to build a new industrial park. The site has been called the most desirable industrial park location in the area, but without the water we couldn't have done it.”

Some land areas—low, coastal plains, for example—have no



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suitable water impoundment sites for lakes, so the engineering work may consist almost solely of improving waterways. The *Mill Creek Watershed Project*, in Bryan and Bullock Counties, Georgia, is an example.

The area has a normal rainfall pattern of excessive rains, followed by long periods of little or no precipitation. After heavy rains, water would stand around for days or weeks. In dry periods, the channels became mudholes.

In 1963, when the area's small watershed project was being planned, 83 percent of watershed land was in trees or forest, 10 percent in crops, 4 percent in pasture, and 3 percent in other uses, including land in the town of Pembroke. Local watershed project sponsors wanted to improve all of these land uses.

The channel work for the project lowered the almost ground-level water table by 1 foot. This helped prevent flooding because the dry soil above the altered water table acts like a sponge, soaking up standing water after a heavy rain, then releasing it slowly and safely into the channels.

However, too low a water table could damage some of the existing trees in the forested area.

To avoid a possible flood prevention-versus-forest land conflict, the local people checked with the U.S. Forest Service on

the optimum water level for the slash and loblolly pines which make up most of the tree species in the area. It was determined that lowering the water table a foot would provide sufficient flood protection while still supporting tree growth in the swampy areas and generally improving the pine growth.

When the watershed project was completed, the acreage of woodland decreased slightly, from 33,029 to 32,829 acres, but the improved water control, combined with easier access to the forest area for fire control and other uses, is expected to mean a more vigorous tree growth.

Total cropland acreage is not expected to increase, although use of suitable cropland may be more intensive. With improved water control, the same land now merits more intensive use.

During the actual channel work, a swath was cut through the forest to accommodate machinery. Watershed people returned 1,341 of these cleared acres to the pine, sycamore, and yellow poplar that had previously existed, while the remaining 923 acres went into wildlife-attracting trees and shrubs such as crabapple, Chinese chestnut, autumn olive, and sawtooth oak. One result, says Bryan County Commissioner Warren Miller, is that "the deer population has definitely increased. Mill

Creek was once nothing but a mudhole. Now there's more for the deer to eat, and there's water throughout the year."

Other changes include an improved sewage system for Pembroke and the development of an industrial site. These were not possible earlier because of the floods and high water table.

The final tally on land use changes since the project's completion 2 years ago: slightly less forested acreage; the improvement of some land for wildlife habitat use; increased opportunities to enjoy hunting; better community facilities in Pembroke, and an improvement in land use for forestry and farming.

In town or out in the countryside, land and water use go together. Watershed projects, by planning for water management on an areawide basis, fit squarely into the land use planning picture. ♦

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SOIL conservation

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SOIL conservation

June 1973, Vol. 38, No. 11

With more time for leisure, better modes of travel, and more money to spend on recreation, people everywhere are heading for mountains and streams, coastal beaches, lakes, and campgrounds.

The heavy traffic would indicate that there simply are not sufficient recreation areas.

The Soil Conservation Service can contribute significantly to both public and private efforts to meet outdoor recreation needs.

This issue of SOIL CONSERVATION points out some of the ways.

COVER: This 12½-acre lake near Dawsonville, Georgia, serves two purposes. One is flood control—and isn't it obvious what the second purpose is? It is to Joe Hulse, Jr., of Cummings, Georgia.

- 235 Recreation—as big as all outdoors
by Dr. Darnell M. Whitt
- 239 This industry is rated "X"—for "excellent"
by Morris S. Gillespie
- 241 New town on Matejcek Dam
- 242 The Barrons of Ox-Shoe Ranch
by Warren W. Brown
- 244 How a conservation plan started a vacation farm
by Ruth Keister Heal
- 246 Bringing back prosperity
by Jerry D. Schwien
- 248 Hunting allowed!
by Robert Tully and Eldie Mustard
- 250 Nature on exhibit
by Carl R. Stamm
- 252 Horses win, tractors lose
by J. T. Beene and W. J. Sauerwein
- 254 Recon
- 255 Review
- 255 Meetings
- 256 From the Administrator
The outdoor recreation "crop" is growing

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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RECREATION— as big as all outdoors

by Dr. Darnell M. Whitt

Deputy Administrator for Field Services, SCS
Washington, D.C.

Americans now spend more on leisure time activities than on national defense. The leisure boom is estimated to have pushed \$105 billion into the economy of the United States in 1972. And dollar totals in sales of leisure time equipment have increased about 52 percent in the past 5 years.

American expenditures for recreation exceed the outlay for new housing. They surpass the total of all corporate profits. And they are far greater than the aggregate income of the nation's farmers. According to a study made by the economic unit of *U.S. News and World Report*, the dollar volume of leisure time expenditures will more than double during the 1970's.

The upsurge in outdoor recreation is already straining facilities in state and national parks. Such phenomenal growth far exceeds the expansion of recreation facilities provided by both the private and public sectors. Opportunities have never been greater for developing commercial recreation enterprises, especially quality facilities adjacent or en route to our more popular public attractions.

The mounting interest in camping has triggered a boom of its own. There are 4 million camping vehicles in the United States, ranging from \$300 trailers to \$25,000 customized motor homes. About 72,000 motor homes were manufactured in 1972; these sold for an average of \$10,000. Only 4 years ago, the annual

output was 13,200, valued at \$114 million.

Public campsites, since 1967, have increased by more than 62 percent. And the number of private campsites is almost double the number of public campsites. One private franchising firm now has more campsites available than the National Park Service.

About 2 million U.S. families own second homes—used primarily on weekends and during vacation. This number is expected to double in the next 8 years.

Snowmobiles are proliferating in astonishing numbers. In 1972, more than 1 million were in operation, and it was predicted then that the sale of snowmobiles, tow sleds, suits, and helmets would make snowmobiling a billion-dollar business in 1973.

Private landowners, private and quasi-public clubs, groups and organizations, and local governmental units established or expanded more than 37,323 recreation developments during fiscal year 1972. This was done with help from the Soil Conservation Service, and other federal or state agencies, provided through conservation districts. Such developments to date total more than 700,000.

Recreation potential appraisals

By mid-1973 the recreation potential of natural resources in more than 80 percent of the nation's counties or conservation districts will have been appraised. The system of ap-

What's your pleasure?



praisal was devised by the National Association of Conservation Districts and federal and state agencies concerned with the recreation use of land and water.

An area's potential for outdoor recreation is determined by gathering and interpreting data on its soils, topography, climate, scenic or natural attractions, historic sites, existing and potential water supply, and wildlife. Other factors considered are the size and distribution of the area's population, occupations and income levels of the residents, the proximity and access to potential facilities, and current land use patterns.

This information is most useful at the district or county level but is also of value to bankers and to state and federal government agencies working in the outdoor recreation or natural resources fields. And, of course, land developers and individual land owners or users find it useful if they are considering the development of recreation facilities themselves.

Recreation land and conservation treatment

Most land needs conservation treatment regardless of the use—field crops, grass, trees, or recreation.

The soil survey is often the key to safe land use and proper conservation treatment. Soil





information and other basic resource data are evaluated to determine the conservation practices needed, such as drainage, land shaping and grading, irrigation, fertilizing, planting, and seeding. Almost all soils are good for some uses and poor for other uses.

The Soil Conservation Service provides technical assistance in the development of land, water, plant, and wildlife resources for suitable uses, including outdoor recreation.

Within the Department of Agriculture, SCS has leadership in developing recreation enterprises on private land and is responsible for liaison with other federal, state, and local agencies working in this field.

SCS technical assistance in developing recreation enterprises deals primarily with developing the land and water resources for recreation use, rather than with the design and layout of recreation facilities or assistance with recreation business management.

Some of the services provided on nonfederal lands by SCS through conservation districts are:

1. Park and other recreation area planning: Locating parks and playgrounds on suitable sites is facilitated by using soil survey maps interpreted to indicate both desirable qualities and hazards on each proposed location. Hazards of flooding or pollution, excessive erosion, soils poorly suited for

buildings, roads, and trails, and soils that do not withstand pedestrian traffic are only a few of the interpretations that can be made from soil surveys.

2. Resource planning and development: In addition to soil interpretations and vegetative and water management information, SCS provides help in land use and open space planning, conducting inventories of existing recreation areas and facilities, and making appraisals of an area's potential for various recreation developments.
3. Project activities: Many Public Law 566 watershed projects and resource conservation and development projects provide for public and private recreation developments that supplement and complement the recreation facilities already available in the community.
4. Income-producing recreation: Individual recreation enterprises, such as camping areas and lodges, vacation farms, dude ranches, riding stables, shooting preserves, and hunting, fishing, golfing, boating, swimming, or skiing facilities, developed as private business to serve the needs of the public often supplement and complement public recreation facilities.
5. Technical assistance: Individual land owners or users, nonfederal public park offi-

cials, and quasi-public clubs receive technical assistance in planning and applying conservation practices needed for the protection and improvement of land, water, and related resources.

Progress on recreation development

SCS records over the past years show that substantial progress has been made in developing recreation opportunities.

More than 12 million acres of land have been converted to recreation-wildlife use to date. More than half a million acres were converted in 1972 alone.

About 10,000 miles of recreation trails have been established to date. And 1972 was a record year with 705 miles of trails established.

About 40 million acres of uplands and 5 million acres of wetlands have been improved for wildlife habitat. More than 7 million acres of uplands and almost half a million acres of wetlands were improved in 1972.

SCS helped public agencies, including county and municipal governments, in establishing 854 public recreation developments in 1972. The previous high was in 1970 when 611 public developments were established.

Recreation as part of RC&D projects and small watershed projects

Resource conservation and development projects offer excellent opportunities to help meet the demand for outdoor recreation. Through RC&D projects, local people inventory, analyze, and plan to meet their resource, social, and economic needs. At present, 123 projects are authorized, and 71 applications for projects are on hand. Outdoor recreation continues to be one of the most popular RC&D project measures.

Watershed protection and flood prevention projects are also effective vehicles for developing recreation opportunities. The Food and Agriculture Act of 1962 authorized cost sharing to qualified local sponsors for up to 50 percent of the cost of construction, land acquisition, easements and rights-of-way, and basic

facilities needed to develop water-related outdoor recreation around lake areas open to the public.

As of June 30, 1972, sponsors of 192 watershed projects in 39 states had planned 221 recreation or fish and wildlife developments, providing an estimated 15.5 million user days of water-based recreation activities such as fishing, boating, and swimming.

Nationwide outdoor recreation plan

SCS, along with other federal agencies concerned with outdoor recreation, is cooperating with the Bureau of Outdoor Recreation in developing a nationwide outdoor recreation plan.

Ten work groups have been established to study problems in providing quality outdoor recreation. Both the public and private sectors are given due consideration for providing future recreation opportunities.

SCS framework plan

SCS, in developing its "framework plan" in 1971, stressed the importance of outdoor recreation as a growing land use. The plan "indicates the direction for future SCS efforts in a role of new emphasis and growing responsibilities."

The framework plan points out that about 1 billion acres of land have potential for rural recreation use and for rural living without seriously encroaching on essential food-producing acres.

The plan gives emphasis to these future needs:

- Greater use of basic soil and water information in selecting and developing recreation and wildlife areas.
- Development of more privately owned recreation areas with particular emphasis on income-producing enterprises.
- An updated inventory of existing and potential recreation areas.
- Greater recognition of the values of recreation, wildlife, and open space on all land regardless of primary use.

More and more people from all walks of life are spending their leisure time outdoors. They want the opportunity to refresh and enjoy themselves in the countryside—skiing, hiking, camping, picnicking, or whatever. The Soil Conservation Service and conservation districts, working together as in the past, can help provide opportunities as big as all outdoors. ♦

This industry is rated "X" —for "excellent"

by Morris S. Gillespie
Public information officer, SCS
Auburn, Alabama

How would you like to picnic under a tall shade tree on your lunch break? Or play a few holes of golf? Or sit on a shaded bank and fish?

Employees of Reliable Metal

Products, Inc., in Geneva, Alabama, can do these things during lunch—without leaving the company grounds.

This company's management has recognized its available nat-

ural resources and developed them for its employees and the people of Geneva.

On the 30-acre grounds, the company has constructed a 9-hole, par-three golf course—it's



"Hurry up, girls! We only get an hour for lunch." Employees of Reliable Metal Products, Inc., in Geneva, Alabama, can play golf during lunch. The golf course is on the company grounds. Waiting in the background are W. B. Simmons, a stockholder in the company, on the left, and Hugh Carroll, an SCS technician.



Claude Nix, an SCS technician, on the right, discusses conservation treatment for the golf course with W. B. Simmons. The pond is stocked with fish and is used for irrigation.

1,063 yards long, and the longest drive is 180 yards—and five sparkling ponds stocked with bass and catfish. The ponds provide great sport for fishermen and a challenging hazard for golfers.

“A round of golf during my lunch hour gives me an opportunity to relax and to enjoy a change of scenery,” said Harold Hix, who is in charge of scheduling and inventory control. He and Johnny Ray, the company’s personnel officer, both agree that the golf course has contributed much to the fine attitude of the employees.

W. B. Simmons, a major stockholder in the company, attributes much of the success in retaining high-caliber employees to the pleasant surroundings.

Hugh Herring, the mayor of Geneva, a town of 5,118 people, is lavish with his praise for the man responsible for developing the golf course on the industry’s grounds. “Bob Simmons is one of the most civic-minded men in Geneva. He went to great expense to provide recreation benefits not only for his employees but for the townspeople as well.”

Mayor Herring believes this opportunity for recreation has had a lot to do with the low crime rate in Geneva.

Mayor Herring continued, “Although the nearest large golf course is in Bonifay, Florida, 17 miles away, we have some good golfers in Geneva. Last year we won the South Alabama Conference, and one of our local boys

received a golf scholarship. I give much credit to the experience our people get on this 9-hole course.”

When the company’s new \$254,000 plant was finished, Simmons decided on the unusual landscaping—unusual for an industrial site, that is—because he wanted to do something for the company’s employees “who were such an exceptional group of people.”

Also, Geneva had few recreation facilities, so the townspeople too would welcome a 9-hole golf course.

One of Simmons’ first moves was to request technical assistance from the Soil Conservation Service through the Geneva County Soil and Water Conservation District. Dr. Richard

Guthrie, an SCS soil scientist, was contacted to study the soil, and Jimmy Holland, the SCS district conservationist in Geneva County, assisted in planning the practices for this unusual development. Guthrie and Holland recall that when they first went to look at the area it was a corn patch.

After the soil and topography had been studied, it was decided that the 30 acres of land surrounding the new plant could be used for a golf course. Five small ponds were recommended to provide fishing and irrigation and to make the golf course more of a challenge.

The company also went to the steering committee of the Wiregrass Resource Conservation and

Development Project and got top-priority assistance.

Reliable Metal Products, Inc., a manufacturer of extruded-anodized aluminum registers, grills, and diffusers for heating and air conditioning, uses water as a coolant in the anodizing process. Water is pumped from two wells at the rate of 120 gallons per minute.

Because a constant flow of cool water is needed, a large volume of water is available for other uses after it leaves the plant. This water is passed through tanks where it is cooled to 80 degrees Fahrenheit, then put back on the ground for irrigating the golf course and replenishing the ponds. Water from the plant is

carried to the ponds by underground pipes.

Although the golf course cost about \$9,000 to install, and the maintenance cost is considerable, Simmons says he has no regrets. He is mindful of the benefits to his employees as well as to the community.

"I'm quite pleased that people are using the course," he said, "especially high school students, couples with large families, elderly people, and others who probably can't afford to go out of town to play golf."

Reliable Metal Products is a giant among industries in the eyes of the local people. It helped to improve their community, didn't it? ♦

New Town on Matejcek Dam



A NEW TOWN SPRINGS UP IN WINTER on Matejcek Dam near Lankin, North Dakota. About 30 buildings, used of course as fish houses, dotted the ice cover of the reservoir last winter.

The houses are of all shapes and sizes. Some are as large as 14 feet, the maximum size allowed, and are shared by as many as three fishermen. Each person who fishes is allowed to have two holes in the ice.

Most of the houses are heated. Some have oil burners, some burn wood, and a few use bottle gas for heat.

At season's end, early in April, the ice was about 36 inches thick on Matejcek Dam. The multiple-purpose dam was built in 1966 on the Middle-South Branch of the Forest River watershed. It has a drainage area of 99.13 acres. The dam is 80 feet high, and its volume is 520,700 cubic yards. ♦

The Barrons of Ox-Shoe Ranch

by Warren W. Brown
District conservationist, SCS
Red Bluff, California

The Lassen Ox-Shoe Ranch, in the morning shadow of towering Lassen Volcanic Peak in the California Cascades, was built by beef, beans, and bronc busters, its owners like to point out.

The Barrons, Bruce and Elna, bought the ranch in 1960, meaning to go into the cattle raising business.

The ranch was already the home of the Manton Frontier Days Rodeo. Conceivably it was the presence of the rodeo arena that soon had the Barrons thinking about turning the place into a recreation ranch.

Even before he made his down payment, Barron called at the office of the Lassen View Resource Conservation District in Red Bluff. The previous owners of the ranch had been cooperators with the district, and Barron promptly signed up to continue the conservation work.

The conservation plan for the ranch included development and expansion of springs, reservoirs, and irrigation systems and improvement of brush-covered pastures for grazing. This work fitted well into the plans taking form in the minds of Bruce and Elna Barron.

After getting advice from the Soil Conservation Service about land capability and alternate land uses, the Barrons plunged them-

It's not likely that these two young visitors to the Lassen Ox-Shoe Ranch are thinking of boycotting that beef. Bruce Barron, proprietor and host, bastes the barbecue on the giant spit driven by the waterwheel in the background.





The ranch offers its guests swimming, trout fishing, picnicking in a cool, pleasant setting—and a rodeo! (Photographs courtesy of Colin Davis.)

selves into the work of improving the rodeo arena and other recreation facilities on the ranch.

It had been a fitting gesture of western hospitality to provide—for a fee, of course—a beef-bean barbecue for the rodeo participants and spectators. But dust and flies from the rodeo grounds made the original barbecue pit and serving grounds highly unsuitable. The Barrons found an ideal spot just below the rodeo arena where a small crooked stream made its way through a brushy valley.

There were drawbacks, however—dense vegetation, downed logs, and rotting tree stumps.

Barron manned an ancient bulldozer for his task. He carefully avoided damage to the stream and the clumps of alders along its banks. When he finished, he had a shady 2-acre island, with the stream tumbling on either side, as the place for serving the barbecue.

At the lower end of the island,

Barron deepened the stream to obtain fill for a small dam. He thereby created a fish pond, which he now stocks regularly with trout.

Where he cleared brush, shaped the streambank, and built the dam, Barron planted perennial grasses to keep the soil in place and to add to the beauty of the setting.

Barron ran across a big water-wheel one day while pursuing runaway cows. He salvaged the wheel, which had been used in years past to power a home hydroelectric plant, and fitted it to a shaft to turn his barbecue spit. Now hundreds of pounds of beef can be roasted at a time with little effort.

The Barrons, seeing the growing popularity of their new venture, decided to sell part of the ranch and concentrate on their recreation park.

They added a combination nature trail and bridle path along a large stream, which flows paral-

lel to their 3,500-foot airstrip. They constructed a pond at the west end of the airstrip where the nature trail terminates.

Aside from their annual rodeo, which is affiliated with Western Approved Rodeos and has received full championship status, the Barrons now restrict use of the park and its facilities to organized groups for weekend outings. This allows time for watering and grooming the park and lets the grass recover from trampling feet.

The Barrons believe that anyone having a feeling for the environment can create an outdoor recreation facility that blends into the natural surroundings.

Little capital outlay is needed, they claim, provided you spread the work out over a long period and do a great deal of the work yourself—beef, beans, and bronc busters help too.

It is a venture the Barrons recommend, if you have a dream like theirs. ♦

How a conservation plan started a vacation farm

by Ruth Keister Heal

West Virginia Institute of Technology
Montgomery, West Virginia

It was in 1950 when my daddy, Leslie Keister of Upper Tract, West Virginia, became a cooperator with the Potomac Valley Soil Conservation District. A year later he worked out a farm conservation plan with help from the Soil Conservation Service's field office at Franklin in Pendleton County.

At that time I was a sophomore in high school and thinking about college. I was very much aware of my family's financial situation; I wanted to help myself in some way but didn't know how.

I recall when the Soil Conser-

vation Service helped daddy with his farm pond. Boy, was I excited! I had just read a booklet about vacation farms. The booklet discussed what is needed to entice city people to spend their vacation on a farm. It pointed out that farming is somewhat of a mystery to many people, especially those who live in cities, and that children and adults are fascinated by farm operations, conservation practices, farm animals, and open spaces. Adults especially relish the peace and quiet.

I knew that my parents liked people and liked having them



Where can children see, enjoy, and learn about farm animals? At a vacation farm.



vacation farm

Moses Taylor, SCS district conservationist, on the left, and Leslie Keister review the conservation plan for Keister's vacation farm.

around—a very important requirement. And our farm is located in a beautiful, easily accessible area. With the pond and other conservation practices that daddy had installed, I was sure we could turn our farm into a vacation place.

I confronted my parents with

the idea, and they liked it. In 1952 we were on our way. That year several families spent some time on our farm. I remember how much they seemed to enjoy themselves.

Today my mother and father are still operating the vacation farm I helped to start. They love people and enjoy making friends. I think they have gained a broader outlook on life. They don't have much time to travel, but people bring the world to them. Also, the extra income helps—it helped put me through college. My parents have grossed as much as \$350 a week during summer.

The "city slickers" that vacation on the farm also gain something. Aside from experiencing beautiful rural West Virginia, they are learning while vacationing. One New York boy, Ben Martilotta, after vacationing with his parents on our farm, decided to major in forestry and now has a career in conservation with the U.S. Department of Agriculture.

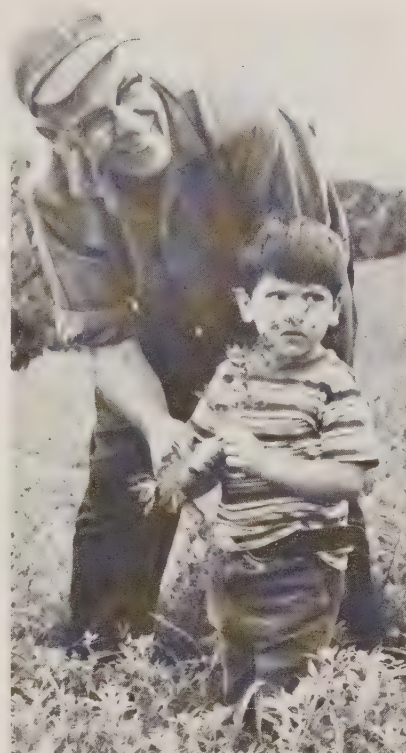
Daddy has more than tripled production on the farm since he began applying conservation practices. I think this is a result of the fine assistance he has received from SCS and other agriculture agencies.

His farming operation includes grassland, livestock, woodland, and wildlife.

Through the years he has constructed farm ponds, developed cool-water springs, installed tile drainage, and applied wildlife and woodland management practices.

For 10 years—while I was finishing high school and college and then teaching—I was a part of our vacation farm, participating in as many activities as possible.

Today I am away from the farm—still teaching, and I make sure all my students know the value of conservation, on the farm and in the city. ♦



The Keisters love children and enjoy showing them around the farm.



Bringing back prosperity

by Jerry D. Schwien

Public information specialist, SCS

Denver, Colorado

Several decades ago, southern Illinois was prosperous mining territory. Then it began to decline in population and growth. Today, a 19,000-acre lake built by the U.S. Army Corps of Engineers is revitalizing this area.

Now that Rend Lake is completed, with its abundant water supply and recreation opportunities, new industry and tourists are beginning to strengthen the local economy.

The new lake not only provides water to 43 communities and rural water districts in a 7-county area but has 13,000 acres of public recreation land surrounding it.

The Soil Conservation Service is helping landowners in the area take advantage of the recreation potential by providing planning and technical assistance in the development of private recreation enterprises.

The first request for SCS help came from Vernon and Lola Kearney, who live in Benton. They asked SCS to survey and design a lake for family recreation. Their lake became a recreation enterprise by chance rather than choice.

"So many people were asking to fish or swim in our lake that we decided to start charging a fee," said Mrs. Kearney. "Last summer we had 400 people in one weekend."

The Kearneys offer camping, fishing, swimming, picnicking, playgrounds, and a recreation center and store. They charge an entrance fee of 75 cents per adult and 50 cents per child. This pays for the privilege of swimming, picnicking, and the use of playgrounds. Fishing costs \$2 per pole for adults and \$1 for children. Campers pay \$3 per day or \$15 per week for a family of four.

William A. "Buck" Morris, SCS district conservationist, reviewed soils data with Kearney and recommended a lagoon to handle wastes. Tight clay soils made a septic tank disposal system impractical. A shower house and 34 trailer sites now have sewer hookups into the lagoon.

Nolan Gulley, who owns 80 acres about a quarter of a mile from Rend Lake, also requested SCS help. He operates a grocery and bait shop to supply campers at the lake. He completed his new store last year.

This year he wants to develop some campsites, and eventually he plans to construct two ponds to grow bait for sale. He planted 15,000 trees including white pine, loblolly pine, and walnut. As they grow, he will sell some of the pines as Christmas trees, leaving others to beautify his campgrounds.

Garrison's Lake, a fee-fishing

development near Benton, is benefitting from the overflow traffic from Rend Lake. Bob Garrison said, "Many of our customers stop here after leaving Rend Lake. We average 1,000 customers per year—many of them repeats."

Channel cat, bass, and bluegill are the main attractions at Garrison's Lake. Last summer's largest catches were a 5½ pound bass and a catfish weighing about the same. But Bob Garrison says there are 9 and 10 pounders in the 6½-acre lake. He charges \$1 per fisherman and 60 cents a pound for catfish and 40 cents a pound for bass and bluegill.

Garrison planted 8,000 Scotch pines, and he also plans to sell Christmas trees.

Morris believes that these private recreation enterprises will continue to grow because of Rend Lake and that the lake's environment and that of the surrounding area have been improved by the private recreation enterprises.

"The Corps of Engineers followed our recommendations in seeding the slopes leading into the lake," said Morris. "They seeded fescue and rye at a rate of 75 pounds per acre and applied 1,000 pounds of 6-24-24 fertilizer and 5 tons of lime. The lush grass should minimize erosion and sedimentation in these critical areas." ♦



It takes two to put up a tent. Camping is just one of the few recreation activities that bring visitors to Rend Lake.



(Above) Fescue and orchardgrass were recommended by the Soil Conservation Service to prevent erosion on the slopes around Rend Lake in Franklin County, Illinois. W. A. "Buck" Morris, SCS district conservationist, has helped many private landowners with recreation developments around the lake.

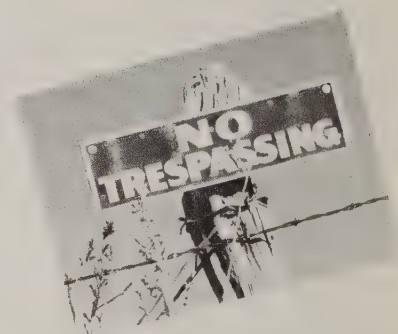
(Below) Vernon's Lake, a private recreation development in Benton, Illinois, is ideal for getting away from the pressures of everyday-living—for young and old.



HUNTING ALLOWED!

by Robert Tully

Small game supervisor
Colorado Division of Wildlife
Denver, Colorado
and Eldie Mustard
State biologist, SCS
Denver, Colorado



To a hunter, the unfriendliest words in the English language probably are "no hunting."

In eastern Colorado, in Lincoln County, 35,520 acres of private land are being improved for pheasant habitat—and hunting IS permitted.

This open-hunting territory, called the Tri-County High Plains Wildlife Management Area, originated with an offer by Alan Moldenhauer to turn over some land to the Colorado Division of Wildlife to be developed for wildlife.

Moldenhauer and his friend, Jerry Withington, both farmers in Lincoln County, talked to other farmers in the area and found many who were interested not only in developing some of their land for wildlife but also in giving their city cousins the opportunity to hunt on their land. It wasn't long before a wildlife management program got started.

Those participating in this truly cooperative venture include:

(1) Private landowners who provide, through a long-term

agreement, the land for wildlife habitat development and hunting.

(2) Colorado Division of Wildlife, which furnishes the men

(3) Soil Conservation Service, which gives technical assistance and onsite recommendations to landowners.

(4) Colorado State Forest Service, which provides tree and shrub planting stock.

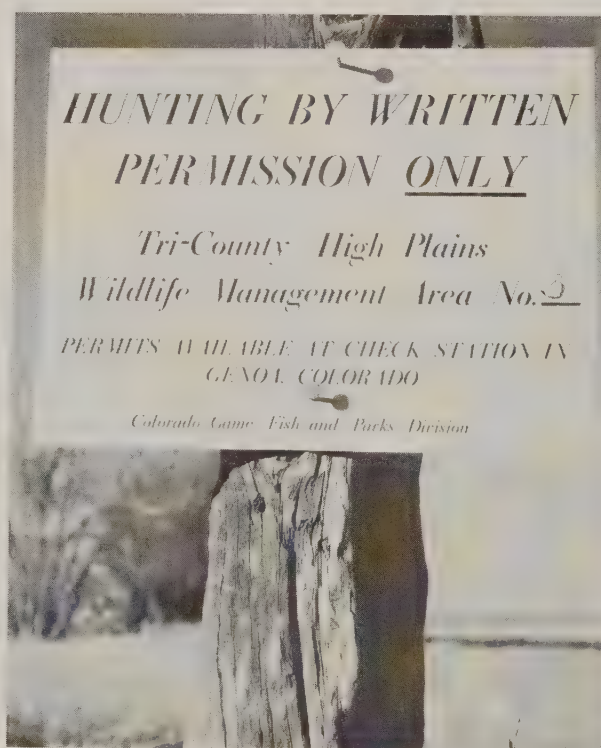
The cooperative wildlife management program began in February 1970. In the spring of that year, about 70 acres of wildlife habitat were planted.

Most of the owners of those 70 acres were members of the High Plains Soil Conservation District and had a conservation plan for their land. The soil information in the plans provided the basis for selecting suitable trees, shrubs, and grasses for the various areas.

The Colorado Division of Wildlife provides the funds and labor for developing and maintaining the wildlife habitat areas. This includes planting, cultivating, and fencing as needed to create new wildlife habitat.

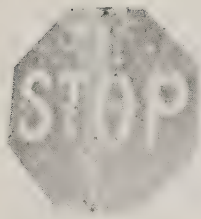
The 70 acres planted in 1970 provided a chance to field test the basic ideas.

Perry Olson, game biologist



Private landowners in Lincoln County, Colorado, have opened up 35,520 acres of their land to hunters. To hunt, just do what the sign says—get a permit at the check station.

and money for wildlife habitat development, check stations, putting up signs, and designating hunting areas.



A happy trio: a landowner who welcomes hunters on his land, a hunter, and an eager dog.



with the Colorado Division of Wildlife, planned, organized, and set up the permit hunting system used in the wildlife management area.

Participating farmers were asked to designate those areas where hunting would be allowed and, more importantly, those areas where no shooting would be permitted, usually around the farm homestead and feedlots.

The land designated for hunting was divided into several areas to distribute hunters evenly and help prevent overuse and accidents. No more than five hunters at a time are allowed to hunt in each of the 640-acre areas. A large party, however, generally is permitted to hunt together.

Those who want to hunt must first visit the check station in Genoa. There, in exchange for their hunting license, hunters are issued a permit and assigned to an area. Hunting licenses are returned upon completion of the hunt.

Hunters like being greeted by signs that say "welcome" instead of "no trespassing." In this part of Colorado, because enough people care about developing wildlife habitat, the greetings are nothing but friendly. And hunters show their appreciation by coming back again and again. ♦



Nature on exhibit

by Carl R. Stamm
District conservationist, SCS
Flint, Michigan



Discovering buckwheat seeds.

The For-Mar Nature Preserve and Arboretum is a green oasis surrounded by an asphalt and concrete jungle.

The 285-acre nature center on the outskirts of Flint, Michigan, used to be a dairy farm. Now it is to be preserved in perpetuity as a nature study area, arboretum, and wildlife sanctuary.

A substantial part of the acreage was given to the Genesee County Parks and Recreation Commission by Mrs. F. K. Merkley; another part was acquired through Mott Foundation funds. Mrs. Merkley lives on 10 acres reserved for her for life.

Forbes and Martha Merkley—the name of the nature center is derived from their first names—were avid outdoor enthusiasts and nature lovers. “We always wanted to preserve our land for future generations to enjoy as we did,” said Mrs. Merkley.

“My late husband could see urban development gradually creeping in all around us. This gave him all the more reason to

want the farm maintained in a natural state.”

An agreement between Mrs. Merkley and Genesee County gave the county its first nature center.

As a first step toward developing the area for use as a nature center, the National Audubon Society prepared a “survey report and outdoor education plan.”

The Soil Conservation Service made its first contribution at this point. At the request of Kenneth Smithee, director of the Genesee County Parks and Recreation Commission, it provided soil information for use in the Audubon report. The Audubon planning staff was also very receptive to SCS suggestions for pond sites and wildlife habitat development.

Although hampered by insufficient money and personnel, the nature center has come a long way. Nearly 3½ miles of wood-chip nature trails have been completed. The chips came from trees killed by Dutch elm disease and removed from Flint city streets.

Two wildlife ponds have been built following SCS recommendations. One, a circular pond with an island in the center, was dug in an old oxbow of Kearsley Creek. Spoil from the pond was used to build access trails and observation points. Wildlife and waterfowl use of the pond has been beyond expectations, reports Dennis Zawol, chief naturalist of the parks and recreation commission.

The other pond relies on runoff for its water. A 1,200-foot-long diversion channel directs surface water to the pond. A windmill donated by the Flint Yard and Garden Club keeps water in the pond during the dry months. A building on a site overlooking this pond is part of future planning.

Wildlife food strips were planted and have been heavily used. SCS recommended contour strips of buckwheat, corn, soybeans, sunflowers, and millet alternated with alfalfa meadow. Byron Ashbough, the commis-



Looking for maple leaves—and insects.



Learning about the past.

sion's chief of outdoor education activities, noted that the buckwheat was eaten as fast as it ripened. Access trails for observation have been located near the food plots.

SCS prepared two soil monoliths for the proposed interpretive building. Both have been on display in the interpretive building now in use. Two soil profile pits were dug; a typical soil profile can be seen along one of the nature trails.

The parks commission purchased shrub and tree seedlings from the Genesee Soil Conservation District. Autumn-olive, American cranberry, nannyberry, and dogwood are some of the fruit-bearing shrubs planted to provide food and cover for wildlife. White pine and white spruce seedlings were planted to provide cover, screens, and borders. Prairie grass was seeded in the spring of 1972.

Emphasis to date has been on the nature preserve zone. Much is yet to come. The arboretum,

for example, will have extensive plantings.

The 13-acre land laboratory is being prepared for use by schoolchildren. They will get firsthand experience in working with soil, plants, and rocks.

A special education area has been reserved for the visually, mentally, and physically handicapped.

The interpretive center now in use is a remodeled house. It has a briefing room with outstanding displays and exhibits. Educational materials provided by the Genesee Soil Conservation District are frequently used in displays.

Several thousand schoolchildren have already visited For-Mar. Guided tours are conducted specially for them. The center is open on Sunday so that adults too have the opportunity to study nature and get away from the city.

The need for outdoor education in the Flint area is great. For-Mar Nature Preserve is a big step toward meeting this need. ♦



Food strips for wildlife. SCS recommended millet, sunflowers, and buckwheat alternated with meadow.

Horses win, tractors lose

by J. T. Beene

Woodland conservationist, SCS
Portland, Oregon

and W. J. Sauerwein

Regional woodland conservationist, SCS
Portland, Oregon

Clem Ault of Estacada, Oregon, is a certified West Coast tree farmer. He's against pollution, noise, damage to the land and to trees, and believes in profits and an easy pace. That's why he uses horses in his logging operations.

Last summer, it was time for Ault to thin his 40-year-old stands of Douglas-fir. He had

completed the last thinning within the last 5 years. This time the trees were sawlog size and averaged about 10 inches in diameter. They would require more work, so Ault decided to use horses instead of a farm tractor.

William Somerville and his sons are horse loggers in Clackamas County. Ault engaged them to log a 7-acre tract on steep

slopes. He planned to complement that cutting with some thinning on flatter ground. Ault marked the trees and laid out the skid trails and landing.

Ault had excellent weather for his logging operations—and the market was good. More than 45,000 board feet of lumber had been removed from about 9 acres. Ault received \$90 per 1,000



Bill Somerville, a horse logger in Estacada, Oregon, heads his team of Belgian horses into the woods for another turn of logs.

board feet of logs down to a 4-inch top. This amounted to \$450 per acre.

There were interruptions in the logging operations. Somerville entered his horses in some county fair pulling contests—and won. “I wouldn’t take \$2,000 apiece for these horses,” he said. “In pulling contests, they’re terrific. And in the woods, it’s a pleasure to watch them work,” Ault added.

Ault bought his 60-acre tree farm, which lies southeast of Portland, in 1961. He moved there in 1964 after retiring from the Soil Conservation Service and immediately became a cooperator with the North Clackamas Soil Conservation District.

He got help with his conservation plan from John Anderson of the Soil Conservation Service. At various times he has asked SCS foresters, state foresters, and a consulting forester for help and advice.

Skid trails on Ault’s land are well laid out. There is no erosion. Culverts have been placed in all creek crossings. The soil is not damaged because the logging was done during the dry season and lightweight equipment was used.

Ault believes in fire prevention. Fire-fighting tools are always ready just in case. He allows no slash burning. He feels it is not desirable because it results in rotten tree butts, even from light intensity fires.

Ault has put to good practice his knowledge and his interest in



This stand of 40-year-old Douglas-fir was recently thinned. About 5,000 board feet per acre were removed. The skid trail was used in horse logging.

woodland management. In 1969 he was named Tree Farmer of the Year in Clackamas County and was runner-up in the state contest the same year. He is active in the Small Woodlands Association of Oregon and has served the association on state committees and in various offices

at the county level.

Ault has a good stand of trees remaining for the next cutting in about 6 years. The trees can grow faster now because they have more space. And if Ault is already thinking about that next cutting, he very definitely has horses in mind. ♦

Yes, but who can spare it? The First Men's Garden Club of Dallas, Texas, with special permission from the U.S. Treasury Department, has been testing shredded currency as a soil additive. The club reports that as a mulch the currency packs like peatmoss, it appears to decompose well in the compost heap, and it has shown no signs of toxicity to plants when mixed into the soil.

Who needs it? The Hanover Inn, owned by Dartmouth College, in Hanover, New Hampshire, announced that it will cease all roadside billboard advertising as soon as current leases expire. The manager of the inn is aware that there is much opposition to billboards from environmentally conscious people, and he himself considers billboards "unsightly" but adds that "they are not really useful anymore."

Roads revamped, recycled, removed. Planners are coming up with some imaginative new uses for roadsides. The South Dakota Highway Department has created 70,000 acres of new wildlife habitat by leaving road rights-of-way unmowed during the nesting season, allowing pheasants and other wildlife to use them for cover.

A stretch of roadside 84 feet deep and 1,200 feet long near Anchorage, Alaska, is being converted into a recreational mini-park.

In Washington, D.C., two construction firms are recycling demolished roads and buildings. The crushed asphalt and concrete, including spoil material from the District's under-construction subway system, is processed for use as aggregate.

And in Salt Lake City, the University of Utah is removing campus streets altogether and replacing them with gently sloped grassed berms, or mounds, which are expected to lower temperatures, reduce noise, and make the grounds more scenic.

Congratulations, it's a girl—scout. Charles Walker, SCS district conservationist in Porter County, Indiana, is now an honorary Girl Scout. The surprise membership was presented to Walker for his assistance in the Girl Scouts' 1972 Keep America Beautiful project—road cleanup and tree planting at the Thomas Jefferson Nature Study Area. Walker helped plan the area and locate tree planting sites. The Girl Scouts also presented Walker with a certificate of appreciation.

Diaper changers wanted. To keep horse wastes from leeching into a major watershed and contaminating drinking water, horses used for logging in Oregon's Bull Run Reservoir area, a vast timberland, are being fitted with diapers—the disposable kind. Horses are used instead of machines in winter because they do less damage to the soil, reducing erosion and drainage problems. With horses wearing diapers, the water quality reportedly has improved.

There's been no great fuss from the horses yet, but the same cannot be said for the diaper changers. It is reported that diaper duty is not catching on so fast among loggers as recycling is in other parts of the country.

"Play money." A "reclamation for recreation" project in King County, Washington, will convert

a 19-acre piece of previously surface-mined area into a public recreation facility. The county is receiving a grant of \$300,000 for this work from the U.S. Department of the Interior. Plans call for two open fields, a softball field, picnic areas, and extensive landscaping throughout.

A similar project underway in Whitley County, Kentucky, so far is the largest of the "reclamation for recreation" projects. Developments there include trails, fishing and boating waters, and campgrounds.

Environmental rights. Under Maryland's newly enacted Environmental Policy Act, all persons have a fundamental and inalienable right to a healthful environment. Modeled after the federal NEPA, the law requires environmental impact statements on state actions impacting the environment.

Erosion and sediment control. Virginia has passed erosion and sediment control legislation requiring adoption of standards and guidelines by the State Soil and Water Conservation Commission. Conservation district programs must be consistent with the guidelines.

Money doesn't grow on trees? The U.S. Forest Service reports that \$338,887,336 was collected through sale of products and fees for land use during FY 1972. The Forest Service paid 25 percent of this sum to 39 states and Puerto Rico for redistribution to counties having national forest lands; it kept 10 percent for roads and trails and transferred the rest to the U.S. Treasury. In 1971, \$227 million was collected.

Review

Landscaping for Birds. Edited by Shirley A. Briggs. 1973. Audubon Naturalist Society of the Central Atlantic States, Inc., 8940 Jones Mill Road, Washington, D.C. 20015. 62 pp., illus. \$1.75.

Birds add the charms of color, movement, and song to the garden. This booklet tells how to make even a small garden or lot attractive to birds. All that is needed is to provide the basic necessities: food, water, and shelter.

One Washington, D.C., yard of less than a quarter acre attracted 16 nesting pairs of 15 species in one season.

Carefully planned plantings make the difference. And the same plantings can provide the home with shade, an attractive setting, and border screening.

Seven chapters cover "Planting for Birds," "Basic Landscape Principles," "Ornamental Trees for Wildlife Planting," "Shrubs Attractive to Birds," plus some special aspects covered in "Landscaping the Bulldozed Lot," "The Birds Come Back," and "The Bird Garden."

The plant species suggested apply primarily to the Central Atlantic States, but the general principles and observations hold good anywhere.

The authors of the various articles include the names of Irston Barnes, whose column "The Naturalist," has appeared in the *Washington Post* and other newspapers since 1951, and U.S. Congressman Gilbert Gude, who trained in horticulture at Cornell University and is associated with his family's nursery business in Maryland.

The questions of where, what, and how to plant are answered in both basic principles and interesting details and sidelights that the authors learned through experience—all invaluable to the home gardener who wants to attract birds.

To provide shelter for safety and for nesting, these are recommended: tall and small trees, densely grouped shrubs, cluster of evergreens, jungle of vines and briars. Plan for variety and plenty of "edge"—the area of separation between the higher or denser plantings and open spaces.

For food: fruits, berries, seeds, nuts, acorns—throughout the seasons. Use trees, shrubs, vines, even ground covers and flowers.

For water: even an upturned trash can lid will do.

The booklet gains its special eminence from the drawings of Shirley Briggs. Trees, shrubs, flowering branches, fruits, holly sprays, a butterfly bush with butterflies and humming birds are used throughout the booklet and suggest the profusion of vegetation attractive to birds. Also, they add to the printed page the same excitement that a bird does to the garden.

An index and list of suggested source books are included.—**Vee E. Weggel, Information Division, SCS, Washington, D.C.**

Meetings

June

- 10-15 Outdoor Writers Association of America, Grand Rapids, Mich.
- 11-14 International Symposium on Remote Sensing and Water Resources Management, Burlington, Ontario, Canada
- 17-20 American Society of Agricultural Engineers, Lexington, Ky.
- 17-22 Ecological Society of America, Amherst, Mass.
- 17-22 American Institute of Biological Sciences, Amherst, Mass.
- 18-20 American Plywood Association, Gearhart, Oreg.
- 20-July 4 American Association for the Advancement of Science, Mexico City, Mexico
- 23-26 Ecology Council of America, Catoctin Park, Md.
- 24-28 American Seed Trade Association, Atlanta, Ga.
- 24-28 National Federation of Business and Professional Women's Clubs, San Juan, Puerto Rico
- 24-30 National Environmental Health Association, Atlanta, Ga.
- 25-29 Air Pollution Control Association, Chicago, Ill.

July

- 1-6 National Education Association, Portland, Oreg.
- 8-11 American Association of Agricultural College Editors, Guelph, Ontario
- 8-12 The American Society of Landscape Architects, Mackinac Island, Mich.
- 10-14 National Society of Professional Engineers, Chicago, Ill.
- 11-13 The Izaak Walton League of America, Duluth, Minn.
- 14-18 American Association of Nurserymen, Inc., Minneapolis, Minn.
- 21-25 National Association of Counties, Dallas, Tex.
- 21-25 National Association of County Park and Recreation Officials, Dallas, Tex.
- 26-27 Great Plains Agricultural Council, Manhattan, Kans.



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From the Administrator:

The outdoor recreation "crop" is growing

A year ago this month, Hurricane Agnes hit the mid-Atlantic states with devastating impact. Billions of dollars in flood damages resulted.

Millions of dollars in damages were averted, however, because small watershed project dams and channels did their flood-control job. The mayor of Wellsboro, Pennsylvania, estimates that his town was spared a \$10 million flood bill because of the manmade lakes in the Marsh Creek Watershed Project.

But that was last June. What about *this* June?

Today, people are fishing in all three lakes of the Marsh Creek Project. One lake provides the town with added water supplies. Another provides boating and picnicking areas for both local people and a growing number of tourists. Last winter, the same lake was used for ice fishing and snowmobiling.

These Pennsylvania lakes are not unique. A growing number of communities now provide residents with a *variety* of water-based benefits, through advance planning of their water resources. Better opportunities for outdoor recreation are by no means the least of these benefits.

The demand for outdoor recreation of all types is growing, as Dr. Whitt makes clear in this issue of SOIL CONSERVATION. The Service and soil and water conservation districts are contributing to both public and private efforts to help meet that demand.

Small watershed projects that include recreation in their planning help to meet recreation needs.

Local recreation resource inventories, already

compiled by a majority of conservation districts, are a valuable source of help to anyone planning for recreation.

And SCS and district assistance to farmers and other landowners in planning public campgrounds, horseback riding areas, hiking trails, fishponds, or farm vacation facilities are other types of help.

Anyone planning a high-quality outdoor recreation enterprise must consider many factors.

SCS concentrates on helping landowners to judge the suitability of their land and water areas for different recreation purposes and then works with them to develop the area in the best possible way, from the standpoint of natural resource use.

Outdoor recreation is a "crop" from land and water, and the skills of the biologist, the soil scientist, the conservationist, and the woodland expert may be needed for the best results.

The public demand for recreation will continue to increase in the next decade. This demand can be met in a way that satisfies the recreation-seeker, provides the landowner with additional income, and results in good, long-term use of land and water resources.

Kenneth E. Grant

conservation

U. S. Department of Agriculture/Soil Conservation Service/July 1973



Three men who know the Great Plains discuss the recreation potential of that vast area in this month's lead article. And Charles Phillips, in the center-spread article, outlines ways to protect and improve land that is used for recreation.

Recreation comes in many shapes and forms. If you get your fun from motorcycles, you may find "Motorcycle farm" of interest. Yes, SCS helped prepare a conservation plan for the farm.

Other articles this month discuss soil surveys (p. 264), wildlife areas (p. 266), and the junior board of supervisors of a conservation district in Tennessee (p. 271).

- 259 **Recreation: a new industry for the Great Plains?**
by Richard L. Bury, Billy H. Hardman, and Robert E. Wagner
- 262 **Motorcycle farm**
by Orin W. Jaquish and Jeffrey R. Loser
- 264 **Soil surveys—a base for building codes**
by W. Barry Baker
- 266 **This land is not for wasting**
by Bert J. Jahn
- 268 **Conservation and recreation sites**
by Charles G. Phillips
- 271 **They're young, concerned, and active**
by Roy Palk
- 272 **A most unusual district**
by Leonard A. Anker
- 274 **Conservation in action**
- 277 **Recon . . .**
- 278 **Review**
- 279 **Meetings**
- 280 **From the Administrator**

COVER: Bear Paw Lake in the Beaver Creek County Park, south of Havre, Montana.

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

PHILLIP A. CHAVEZ, Editor

GEORGIE A. KELLER, Production Editor

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Recreation: a new industry for the Great Plains?

by Richard L. Bury
Billy H. Hardman
and Robert E. Wagner

To many people, the Great Plains call up images of heat waves shimmering over flatlands, unrelenting sun, blizzards, duststorms and tornadoes, and mile upon mile of monotonous prairie. For them, this wide and relatively treeless area represents a recreation desert between the attractions of the western mountains and those of the eastern woodlands.

But to others, the Plains contain much of interest—great rivers, picturesque badlands, sandhills, canyons, mesas, spacious vistas, and even a manmade forest. The land is rich in the history of homesteading, cattle drives, the Sioux and other powerful Indian nations.

Recreation potential

The Great Plains can be developed to meet the recreation needs of many people. Natural, cultural, and historical assets occur in smog-free areas suitable

The authors: Dr. Richard L. Bury is associate professor in the Recreation and Parks Department, Texas A&M University, currently on detail as assistant to the director, Division of Recreation, Forest Service, U.S. Department of Agriculture. Billy H. Hardman is range and wildlife staff officer, Roosevelt National Forest and Pawnee National Grassland, Fort Collins, Colorado. Robert E. Wagner is resource liaison officer, Pike-San Isabel National Forests, Pueblo, Colorado.

for recreation and within a day's drive of 2 million people. The weather is conducive to many types of recreation in all seasons.

Upland game hunting and waterfowl hunting are big attractions. For example, pheasants of the Dakotas attract hunters from all over the nation.

Artifact hunting, rock hounding, and antique hunting are very popular. City dwellers are increasingly interested in history of the frontier and the homestead era. People drive many miles to see and relive the sights of their childhood and to tell their children or grandchildren about conditions during the early days.

Some of the canyon lands contain ancient rock carvings and inscriptions, interesting to many and of special attraction to camera buffs.

Opportunities on private land

Development of a recreation industry in the Great Plains could supplement and complement agricultural income while providing a needed service to recreation-seekers. In addition, a recreation industry can strengthen and stabilize the economic base of small rural communities.

Through recreation enterprises, the private landowner has an opportunity to gain supplemental income, diversify his base of operations, and support other businesses within the community through his purchases.

A landowner might offer public hunting of upland game by developing a rotation grazing system; cattle could be moved out of the better bird habitat during the hunting season. Simple wildlife shelters and water developments, habitat manipulation, and appropriate farming practices all could be used to concentrate upland game in selected areas.

Many canyons offer special possibilities for hiking and bird watching; minimum-development roads and picnic sites could be provided. Landowners adjacent to waterfowl lakes could develop and encourage field hunting.

Frontier history and the homestead era could come alive to

A fine site for a ranch resort.



visitors through preserving windmills and storm cellars and displaying early farming implements and practices. Many of these opportunities can be better developed as a joint venture of the community or of several owners rather than a single owner.

A farmer or rancher who wishes to enter the recreation industry needs to inventory the possibilities on his land, identify alternatives that best complement his operation, evaluate his managerial and financial ability, and consider visitor preferences.

He will need information from public agencies and private recreation managers. Help is available from many county, state, and federal agencies such as the Agricultural Stabilization and Conservation Service, Farmers Home Administration, Soil Conservation Service, Forest Service, Extension Service, state game and fish departments, and state recreation and parks departments.

And in the public agencies...

For many years, public agencies have helped develop the recreation potential of the Great Plains. They have advised ranchers and farmers concerning initiation and operation of recreation enterprises. In addition, agencies often develop recreation facilities on resources they administer and thus seek to complement the facilities offered by ranchers and farmers.

Through its Conservation Operations Program, the Soil Conservation Service provides technical assistance to landowners and operators who are considering land development for recreation. Under certain conditions, eligible participants in the Great Plains Conservation Program can receive limited cost-sharing assistance for recreation.

SCS also provides technical and financial help to sponsors of

small watershed projects and of resource conservation and development projects who wish to develop public water-related recreation facilities within their project area.

Under authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566, as amended), the Department of Agriculture can pay up to half the costs of enlarging a reservoir, buying additional land, and installing basic facilities for recreation, health, and safety.

Similar assistance is available under the RC&D program. Local sponsoring organizations pay their share of the recreation development costs, and they operate and maintain recreation facilities and other project structural measures.

Long-term watershed loans are available from the Farmers Home Administration to help project sponsors pay their share of construction costs.

The Farmers Home Administration also can lend money to farmers who want to increase their income by converting all or part of their land to income-producing outdoor recreation enterprises.

The Agricultural Stabilization and Conservation Service provides cost-share assistance to farmers for programs such as shelterbelts, wildlife habitat improvement, and fishing reservoirs and provides financial incentives to develop recreation opportunities on lands set aside from agricultural production.

The Forest Service provides recreation opportunities on the 18 National Grasslands and several National Forests it administers in the Great Plains. The professional staffs of these Grasslands and Forests have been very active in advising nearby ranchers and farmers about development of recreation enterprises.

State agencies also provide recreation opportunities through state parks and other recreation areas. Often, the administering departments are coordinated with state fish and game departments. Many states own and operate game management areas under a limited multiple-use concept whereby wildlife habitat and management is the primary use and other compatible uses are allowed.

Some states lease private lands for public hunting and fishing;

The Great Plains offers a variety in landscapes.





Riding and hiking trails have great potential in the Great Plains.



Remains of an old sod house built by early settlers in northwestern Oklahoma. Such attractions are of interest to many tourists.

these are used as if they were public lands but are managed by private owners. Income from recreation leasing, however, usually is secondary to income from agriculture.

Cooperation is essential

Management of the recreation resource, as with all resources of the Great Plains, can attain its highest development through a

coordinated effort of all landowners.

Most of the Great Plains is privately owned, but public lands are scattered throughout. Ideally, development of a recreation industry should be coordinated among the landowners within market areas determined by the recreation attractions and the demand for them. Such coordination is a must in providing the

type and variety of recreation opportunities desired. In this way, recreationists can be drawn to the area and spend sufficient time and money to make the recreation enterprises profitable.

No single agency or landowner need provide the full range of recreation opportunities. Instead, a farmer or rancher must rely on his neighbors to provide opportunities or facilities that complement his own services.

Recreation facilities on public lands should supplement those on private lands, rather than compete with them. Agencies are now encouraging private landowners to provide the necessary facilities where such developments would be profitable and where private lands have suitable characteristics and locations.

In addition to such coordination with private landowners, agencies should cooperate among themselves. This total effort for planned, orderly development can help insure high-quality recreation opportunities and can also allow full development without unnecessary duplication or overdevelopment. ♦

Motorcycle farm

by Orin W. Jaquish
and Jeffrey R. Loser
Soil conservationists, SCS
Leesport, Pennsylvania

Motorcycles, snowmobiles, and other types of all-terrain vehicles are enjoyed by many outdoor recreation enthusiasts—but are cursed by landowners whose fields are trespassed

Cyclists in the eastern Pennsylvania and New Jersey region, however, can ride any number of trails that traverse fields, woods, and meadows without trespassing or having to watch behind their shoulder for the police. Moto-

Mecca gives them this opportunity.

MotoMecca could be called a “motorcycle farm.” It is located near Lenhartsville, Pennsylvania, along U.S. Route 22, in the heart of the Pennsylvania Dutch country.

This is the first park or farm of its kind in Pennsylvania, but Clair Atwell, who developed the park and who is a cyclist himself, has assisted others in planning similar motor sporting parks

throughout the East.

“Some people think that all cyclists are law-breakers,” Atwell declared. “Once a woman actually threw a frying pan at me as I rode by on the street. We don’t encourage motorcycle gangs to come to MotoMecca. This type of riding is not their style,” he added.

The style of riding at MotoMecca is strictly off-road. There are climbs, jumps, and sharp turns. The trails run through fields, woods, and streams and range from difficult (marked by red triangle-shaped signs) to easy (marked by green circular signs). Those accustomed to street riding can find many surprises and thrills on these trails.

Safety is not overlooked at MotoMecca. “We inspect every cycle that we rent,” Atwell explained. “Brakes, fuel, lubrication, and even a rider’s protective clothing and helmet are checked. Then we make sure the rider has sufficient skills to ride the trails. We give special instruction to unskilled riders, and we have a safety patrol that rides over every trail. The park is open to all types of off-road vehicles, but motorcycles (trailbikes) are the most popular.”

Atwell spent about 3 years searching for the “perfect” location for his motorcycle farm. As Atwell put it, “I was looking for a farm that wasn’t making it for agricultural purposes. I needed a location that was close to major highways and metropolitan areas, and rolling terrain with woods and a stream was a must.”

The surrounding environment is high on Atwell’s priority list. The park is monitored for noise in decibels to insure that neighbors are not disturbed.

Atwell foresaw that the constant wear and tear on the soil by cycles could cause rills and gullies with each rain. Before one cycle rode over the property, he arranged through the local con-

Ready to hit the trails at MotoMecca in the Pennsylvania Dutch country. The style of riding is strictly off-road.





All trails were planned with help from the Soil Conservation Service. The motorcycles are contained in a set pattern of trails that are regularly maintained and stabilized.



servation district to get help from the Soil Conservation Service. Diversions, sod waterways, and critical area stabilization are all part of Atwell's conservation plan. Also, a light oil treatment on the trails helps to check erosion.

The vehicles at MotoMecca are contained in a set pattern of trails. The trails are regularly groomed and stabilized; erosion and other damage can thus be prevented or corrected readily.

"Controlling erosion is most important to us," said Atwell. "Trails with gullies discourage riders." The diversions not only slow surface runoff and help reduce erosion but also make the trails more challenging.

Protection of the environment combined with fun and profit have made MotoMecca a success, in Atwell's estimation. And his customers—those cyclists who enjoy off-road, all-terrain riding—say it's the best thing that ever happened to them. ♦

Soil surveys— a base for building codes

by W. Barry Baker
City manager
Canfield, Ohio

"The past 4 years of cooperation between the municipal officials of Canfield and SCS have produced the first workable building code based on soil conditions."

For its first 100 years, Canfield, Ohio, was a quiet, agricultural village located in the industrial complex of northeast Ohio. In the late 1950's, the community became one of the fastest growing cities in the area. It was developing into a prime residential community.

During this period of growth, the city council felt relatively secure. Their zoning ordinances and subdivision regulations had been adopted by the people. Then, in the middle 1960's, it readily became apparent that there were problems—severe problems. Basement walls began caving in. Streets started to break up.

It became evident that land that had produced bumper crops

for farmers would not necessarily "grow homes and streets." The natural reaction was to blame poor construction or inadequate inspection for cracking walls and poor streets. After extensive investigation, however, it became apparent that improper construction could not account for all of the problems.

Fortunately, Canfield had been the site of the Mahoning Soil and Water Conservation District office since 1949. In early 1968, Fred Merrill, then district conservationist for the Soil Conservation Service, suggested to the city council that the basic problem might be the soil conditions. Soil scientists with SCS had just completed the soil survey for Mahoning County. These comprehensive maps identified the types of soil in the area.

Once the types were identified as Trumbull, Geeburg, and Remsen, it was relatively easy for Merrill to explain their characteristics and relate why there were problems. He told the council that soils were like people—they all don't act the same. These particular soils are similar to a sponge.

They expand when they are

wet. Therefore, when the spring rains occur in Canfield and soils become saturated with water, they expand with such force that conventionally built basement walls are pushed inward. These soils also retain moisture and, therefore, are very susceptible to frost action. Over the course of a couple of winters, conventional roads built on these soils deteriorate rapidly.

The city council and planning commission met with the SCS men to determine what action should be taken. It was decided to have a private engineering firm design wall foundation requirements that would withstand excess water and extreme pressures. The engineering firm also would develop street construction standards to withstand these same water problems.

The Soil Conservation Service divided the soils into five groups defining the major problems—steep soils, wet soils, high shrink-well soils, restricted soils (flood plains), and relatively favorable soils. The engineering firm drew up building codes to meet these different soil problems.

In early 1970, after being recently appointed as the first city manager in Canfield, I asked Merrill to take me on a "base-

ment tour," so that I could have an understanding of the extent of the problem. I recall a certain degree of skepticism to reports of gaping cracks in basement walls of houses that were less than 2 years old. The afternoon tour of the problem areas, however, convinced me that the reports had not been exaggerated.

Merrill told me that the only permanent solution for the owners of these houses was to reconstruct the foundations. He further stated that the only practical solution was to excavate the exterior of the basement walls and then backfill with a "cushioning" material. This procedure cost \$2,500 to \$3,000 per house and did not guarantee a permanent solution.

In one of my first reports to the council, I expressed my doubts as to whether new buildings were being built in compliance with the recently enacted foundation requirements. In private talks with the individual home builders, it was apparent that all were aware of the new requirements, and all were doubtful that their competitors were following the requirements. The home builders also stated that they would be willing to pay increased permit fees so that the municipality would be able to hire a full-time inspector.

The city council readily accepted the philosophy that their

regulations would be only as effective as the inspection and authorized the employment of a full-time zoning inspector. Once again, SCS offered its continued assistance. Merrill arranged for a brief training program for an inspector with a soil scientist.

Under the direction of the city manager, and in close harmony with the SCS office, the zoning inspector is involved in coordinating the critical soil information with all aspects of community development. Plans for development now follow a definite flow chart. When a preliminary subdivision plan is submitted to the planning commission, it is referred to the design board, the engineering consultant, and SCS for technical adequacy. The past 4 years of cooperation between the municipal officials of Canfield and SCS have produced the first workable building code based on soil conditions.

During this period, Canfield has adopted a major thoroughfare plan based, in part, on the location of favorable soils. Currently, the city planning commission and the city council are revising and updating the comprehensive plan, zoning ordinance, and subdivision regulations.

These revisions will incorporate the changes which we feel are needed to improve our control over uses of land in the problem soils area.

Our experience with the process of change or innovation might be somewhat unique. There definitely were visible problems. These problems resulted in costly maintenance for both the government and private individuals; therefore, there was no problem in explaining why these actions were necessary.

It has been very refreshing to deal with representatives of the federal government without having to fill out forms for Columbus, Chicago, or Washington. Maybe the innovation award was presented to Canfield because we have developed a program with federal assistance which has taken 4 years to evolve, and not once has there been any mention of "a HUD guideline." ♦

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This land is not for wasting

by Bert J. Jahn
Biologist, SCS
Ephrata, Washington

Waste land. Idle land. These terms are heard often in farming communities—and not in reference to anything good. Most people are opposed to waste and can't tolerate idleness.

In the Columbia Basin, an area of half a million acres in central Washington, odd areas that aren't producing crops are called waste land or idle land. These areas include ditch-banks, rights-of-way, and high spots that can't be irrigated. Some areas are less than an acre in size; others, like canal banks, extend for many miles.

Most of these odd areas are producing grasses, weeds, brush, or trees, so they really aren't idle. And if this vegetation is good for anything at all, then the areas aren't wasted.

Roger Wood, a landowner in Moses Lake, sees some definite value in these areas.

"They're good places for wildlife," he said. "Besides, the natural cover holds the soil in place."

Wood's thinking about odd areas is shared by the many Columbia Basin farmers who are putting new life into the land—wildlife. These farmers, in the last 5 years, have set aside 22,200 acres of uplands and 2,252 acres of wetlands for wildlife.

Odd areas in the Columbia Basin have always provided habitat for many beneficial forms of

wildlife, from the alkali bee that insures seed crops by carrying pollen from plant to plant to the songbirds that feed on weed seeds and insect pests.

One of the most colorful inhabitants of these areas is the ring-necked pheasant. This hardy bird of Mongolian and Chinese extraction has made the Columbia Basin famous among sportsmen and students of birds.

The success of the pheasant in the Basin is tied directly to odd areas. Like all forms of wildlife, pheasants need food, water, and cover to survive. These essential elements must be close enough together so that they are readily available at all times. Ideally, they should be adjacent to each other.

Odd areas supply some food for pheasants, and they often have a water supply. But their big contribution is cover. High brush and cattails give protection from stormy weather, predators, and hunters. Low and medium grasses are fine for nesting, and moist, sedge-covered areas are favored for roosting at night.

A cock pheasant usually picks out a grassy area as his territory for the spring mating season. It is here that he assembles his harem, announcing his presence by crowing and flapping.

Were it not for the nesting cover provided by these odd

spots, there would be few pheasants in the Basin. Without them, a greater number of birds would be lost to the hay mowers.

The pheasant flock spends its leisure time in these areas, taking dust baths or just loafing in the sun. From there it makes trips out into cropland for a meal of caterpillars, grasshoppers, or waste grain. In these areas the chicks grow to maturity. There also the sportsman comes with his dog in the fall to harvest surplus birds.

The ring-necked pheasant, a widely hunted game bird in the Pacific Northwest, finds suitable habitat in "odd" areas.





A Russian-olive thicket (above) offers superb habitat for pheasants and songbirds; cattails and willows (below) stop soil erosion and provide good winter cover and escape cover for pheasants.



Many questions have been asked about managing odd areas. The answers aren't easy. Farm equipment can't ordinarily be used because most areas are too rough or hard to reach.

For controlling weeds, nothing does it better than a healthy stand of grass. It doesn't matter what kind, as long as the grass is perennial and vigorous. Crested wheat is suited to dry spots and tall wheatgrass to salty areas. Fertilizer helps, but it should contain enough nitrogen to favor grass over weeds.

Some farmers burn odd areas regularly in the hope of destroying weed seed. This rarely works. Annual weeds produce far more seeds than they need to propagate themselves. Even if 95 percent of the seeds are destroyed in the fire, the remaining 5 percent are enough to reseed the area.

Furthermore, burning creates a good seedbed for weed seeds. It sets back the perennial grasses, making them less able to compete with weeds. Burning also destroys badly needed cover for pheasants and other birds.

Nature always favors the perennials over the annuals. The best management then for these "wildlife areas" is to help when possible and refrain from interfering.

The birds will love us for it. ♦

Conservation and recreation sites

by Charles G. Phillips
Soil conservationist
Resource Development Division, SCS
Washington, D.C.

Land used for recreation needs conservation treatment just as much as land used for crops or grass or forest.

The Soil Conservation Service gives technical assistance in planning land use and conservation treatment for recreation developments. It provides landowners and recreation planners with resource information to help them determine site suitability for various types of recreation. SCS also helps gather the resource data, interpretations, and evaluations they need to develop suitable conservation alternatives.

Basic resource inventories

People considering recreation facilities should first inventory

and evaluate the physical resources available.

Soil. A soil with certain characteristics may be suited for one kind of recreation development and wholly unsuited for another. The soil survey can be used to locate suitable sites for recreation facilities and for recreation related uses, such as second homes, access roads, ponds and reservoirs, septic tank disposal fields, and sewage lagoons.

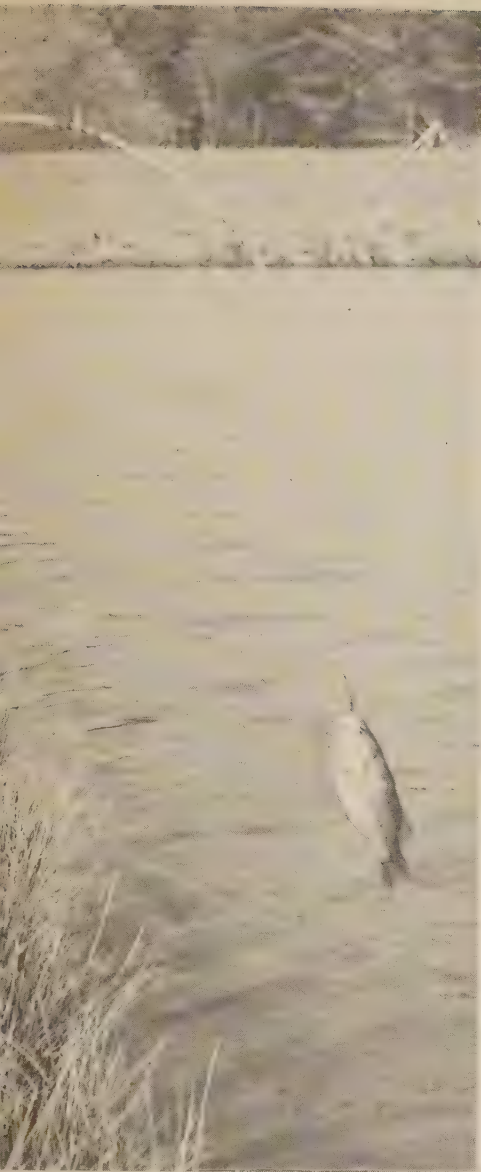
Water. Quality of water and its supply are of major importance in recreation development. Before making decisions regarding such development, landowners should investigate watershed boundaries; potential impoundment sites; areas subject to flooding; irrigation water supply; drainage, irrigation, and other special purpose

(Right) More than 2 million families in the United States have second homes for use on weekends and during vacation. Selecting a suitable site can help prevent resource related problems.

(Right, center) The growing demand for outdoor recreation causes overcrowding of facilities on weekends and holidays.

(Extreme right) The Crow Wing Canoe Trail, developed largely through the efforts of the WesMin Resource Conservation and Development Project, provides excellent outdoor recreation opportunities.





(Left) A well-designed and well-managed pond can provide many hours of fishing enjoyment. (Below) Horseback riding is one of several recreation activities normally provided by the private sector. Proper maintenance of the trails helps to insure safety.



districts; and state water-quality classifications.

Plants. Developers should look into native and commercial plants suitable for erosion and sediment control, for intensive use areas or critical and fragile areas, for wildlife habitat, and for beautification.

Wildlife. Wildlife can add much to the enjoyment of campers, hikers, photographers, and naturalists. Provisions for increased wildlife populations should be planned into an outdoor recreation development. Surveys of wildlife population by species and of the potential for development are very useful to the landowner, as well as specific measures to improve food supply, habitat, and ponds.

Climate. Weather data, including amount of snowfall, number of continuous days of below-freezing temperatures, amount of rainfall during summer, and number of sunny days as opposed to cloudy days, are all useful in determining the potential for various kinds of recreation. Rainfall distribution and temperatures during the growing season are also important considerations, especially where grasses need to be maintained in intensively used areas.

Natural, scenic, and historic areas. Unless they are outstanding landmarks or a significant part of our heritage, natural, scenic, and historic areas generally cannot attract tourists on their own. Such areas, however, can add interest to a recreation enterprise. Many kinds of recreation facilities can be planned to supplement these attractions.

Resource conservation planning

The technical assistance that SCS provides for recreation sites is much the same as that provided for other land uses. The practices in the National Handbook of Conservation Practices

and the standards and specifications for such practices determine the planning and implementation help that SCS gives.

Determining objectives. Usually the landowner has general objectives in mind when he goes to his conservation district for technical assistance. He may, however, refine his original objectives after reviewing data about soil suitability and limitations.

Data evaluation. The interpretations, analysis, and evaluation of basic resource data are done within the framework of the landowner's stated objectives. Practical alternatives are developed after evaluating the available resource data.

Recreation sites

SCS helps the landowner to appraise the physical suitability of sites for recreation facilities. Are there limitations? Can the limitations be overcome? What are the alternatives? What is the ultimate decision regarding physical limitations, economics, management, and maintenance? These and other questions should be considered in selecting a site for various recreation facilities and in their design.

Although SCS does not design recreation facilities, the conservation plan takes into account the size, shape, and location of the various facilities.

In developing a campground, for example, the location of campsites may be dictated by natural features, such as streams, lakes, topography, critical areas, and vegetation, as well as by the planning of manmade measures, such as septic tank waste disposal fields, sewage lagoons, access roads, ponds, lakes, diversions, and waterways.

Typical designs of recreation facilities assembled by the Park Practice Program of the National Conference on State Parks and designs from other sources are often used by recreation entre-

preneurs, consultants, and others having a need for design assistance.

Protection and maintenance

If a recreation facility is designed and installed with care, a landowner can reduce maintenance and avoid future headaches.

Site protection during construction. Much of the soil erosion from new developments takes place during construction. The damage is usually in direct relation to the amount of bare soil. To reduce this damage, care should be taken to save trees, shrubs, and grasses, especially on hillsides.

Where most of the vegetation is removed during grading, debris basins, waterways, and diversions should be installed. Topsoil should be stockpiled for use in the finished grade. Seeding and mulching for a temporary cover may be needed.

All erosion control practices should be maintained throughout construction or until permanent vegetation is established. Some structures may be needed permanently.

Site protection during recreation use. Overuse is a common problem on recreation sites. Most facilities have a "people carrying capacity," that is, they are designed for a certain number of users per day. Traffic, weather, soils, and topography determine the carrying capacity of a recreation facility.

To often managers fail to limit use to the carrying capacity of the facility, or they fail to implement an effective maintenance program.

Fertilization, irrigation, reseeding, replanting, traffic control, and other maintenance practices often are needed to protect the facility during use.

Conservation practices. Prac-
Continued on p. 276

They're young, concerned, and active

by Roy Palk

Associate member

Macon County Soil Conservation District

Lafayette, Tennessee

Historically, leaders and activists in the conservation movement have been adults—Theodore Roosevelt, John Muir, Gifford Pinchot, Aldo Leopold.

Today, conservation leaders come in all sizes and ages. The Junior Board of Supervisors of the Macon County (Tennessee) Soil Conservation District is composed of seven teenagers and is

a prime example of young conservationists in action.

In 1972, Jill Hauskins, Charlotte Jenkins, Beverly Vaughan, Ricky Cowan, Timmy Ferguson, Danny Law, and David Swindle were selected to serve as Tennessee's first junior board of supervisors of a soil conservation district.

"Young people of today have a

genuine interest in working with adult conservation leaders to improve the quality of the environment in their communities," said James Painter, chairman of the Macon County Soil Conservation District.

"These young conservationists are helping to make known and enlist support for the district's efforts to control erosion, sedimentation, and pollution and for all the other conservation activities that combine to make Macon County a cleaner and better place in which to live."

Nominees for the junior board were selected on the basis of their accomplishments in 4-H clubs, Future Farmers of America, and Future Homemakers of America. From 18 nominees in sophomore, junior, and senior classes, the Macon County District Board selected seven young people to serve on the junior board.

The young board members quickly became involved in community activities. They played a leading role in the Macon County Youth Fair held for the first time in 1972. They have participated in all programs and meetings of the district board and have developed an ambitious list of projects to carry out during the year, including countywide cleanup day, conservation programs and displays in community schools, promotion of outdoor classrooms and conservation education activities, and participation in the annual statewide observance of Soil Stewardship Week.

"This opportunity to work in the conservation district movement can help these young people and their peers to learn more about local units of government," Painter said. "And it can teach them to contribute their views and opinions to the operation of local government. Young people are the future leaders of conservation districts and tomorrow's stewards of our resources." ♦



Members of conservation district junior boards believe in action. Here Beverly Vaughan and Tim Ferguson hold a new district boundary sign as Rick Cowan loosens fittings on the old one. William B. Green, on the right, is president of the Macon Bank and Trust Company and a member of the Macon Soil and Water Conservation District Board of Supervisors. The Macon bank bought the new sign.

A most unusual district

by Leonard A. Anker

Resource conservationist, SCS

Carson City, Nevada

A soil conservation district without farmers—would you believe?

It's almost true in Nevada.

Tucked into the western corner of Nevada is the Tahoe-Verdi Soil Conservation District. This district takes in the city of Reno

and works largely with land developers in the fabulous Lake Tahoe Basin. Ranchers? Well, you could probably count them on your fingers.

Much credit for the district's successful programs must go to John Buckwalter and to the board

of supervisors, none of whom are ranchers or even connected with agriculture. Buckwalter is chairman of the board and a retired aircraft executive.

The district uses the soil survey to help carry out land use plans made in cooperation with

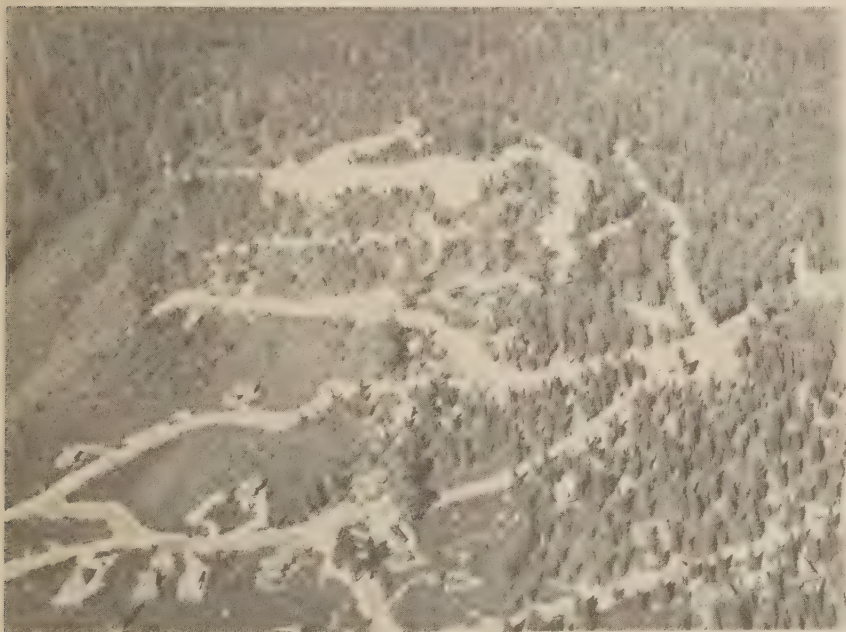


Lake Tahoe, often called the Lake in the Sky (elevation 6,229 ft.), is unique among the world's high-altitude lakes with its unusually clean, cold, blue and turquoise water. But constant vigilance is necessary to prevent pollution.



(Above) Preserving the beauty of the Tahoe Basin depends on people management. During the sixties the basin had an annual growth rate of 7.75 percent in permanent population. In 1970, at the height of the tourist season, more than 100,000 people were working or playing in the basin. Visitor days at state parks, golf courses, ski areas, private beaches, and other recreation facilities totaled almost 2½ million in 1970.

(Below) The Tahoe-Verdi Soil Conservation District, with assistance from the Soil Conservation Service, reviews all subdivision plans in the Nevada portion of the Tahoe Basin.



the Tahoe Regional Planning Agency.

To preserve a unique and fragile environment and to prevent eutrophication of crystal-clear Lake Tahoe, ecological factors get the highest priority.

The major effort is keeping sediment from entering the lake. As Buckwalter sees it, "If you stop the erosion, you stop the sediment." He feels that the district, with help from the Soil Conservation Service, is qualified to do just that.

The district also makes recommendations—most of which are adopted—to county planning boards on land development.

Washoe County's high regard for its conservation district is reflected in the financial aid it gives to the district. Because of this aid the district can operate an office at Incline Village.

Recent changes in Nevada district law will add a county representative to each board of supervisors. This board has already laid the groundwork to get a county planning director appointed to the board.

"The Tahoe-Verdi Soil Conservation District clearly illustrates the adaptability of districts in meeting resource challenges," commented Charles Krall, the SCS state conservationist. Anyway you look at it, it's a far cry from the usual conservation district operation. ♦

conservation

in action

"A Special Genius"--SCS multimedia show

The new SCS multimedia presentation, "A Special Genius," went on the road late in May with a series of showings at Widener College, in Chester, Pennsylvania, under the auspices of the Delaware County Soil and Water Conservation District.

The 33-minute show, which uses three screens, six projectors, and a four-tract stereo sound system, derives its title from a statement by land use authority Marion Clawson: "One special genius of the American people is the independence, initiative, and imagination of typical citizens."

"A Special Genius" uses several brief vignettes, all photographed on location, to tell the story of soil and water conservation in the United States and something about the people who make the program work.

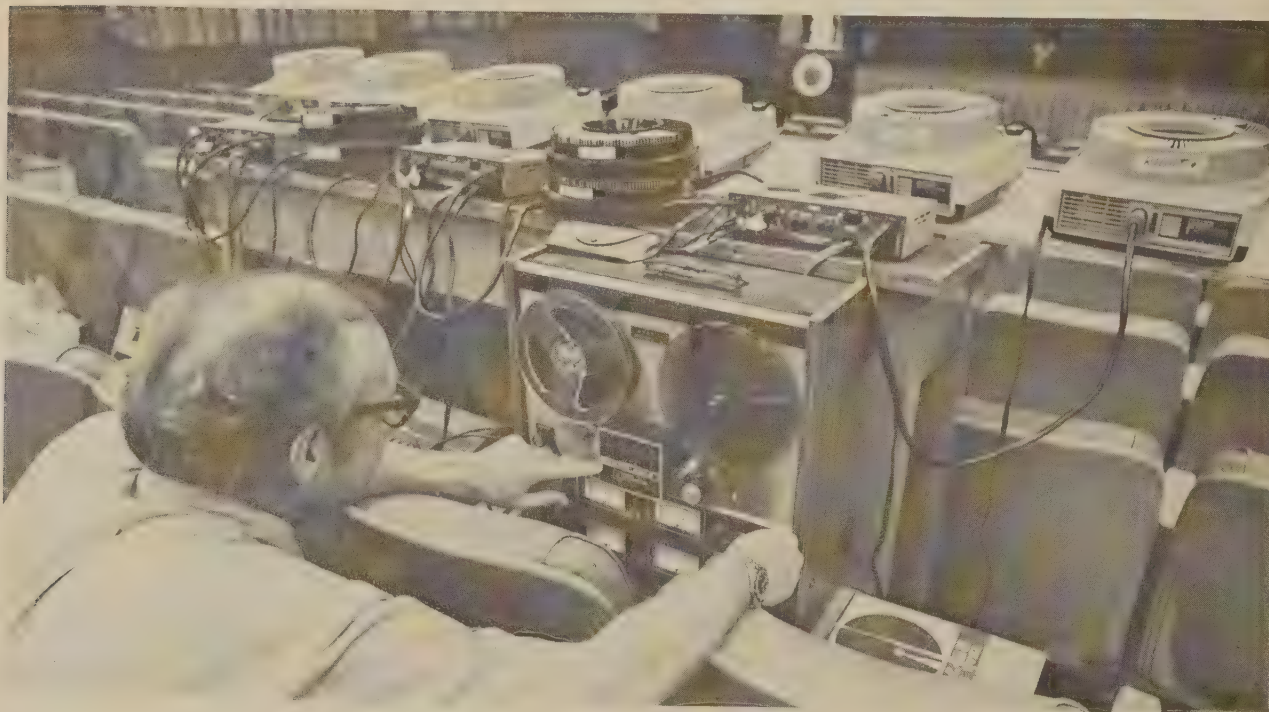
The presentation premiered last February at the annual convention of the National Association of Conservation Districts in Las Vegas and was subsequently shown to U.S. Department of Agriculture officials and their guests in the Department's Jefferson Auditorium in Washington, D.C.

Like other multimedia productions, "A Special Genius" requires several hundred pounds of electronic equipment and the talents of two operators to present.

"For this reason, we are forced to limit showings to large meetings, preferably of non-SCS and district people, generally in locations that we can reach by truck," reports Hubert Kelley, SCS information director and co-creator of the show with E. Joseph Larson, chief of the SCS audio-visual branch.

"A big national meeting of an environmental, wildlife, or educa-

E. Joseph Larson, chief of the SCS Information Division's Audiovisual Branch, checks several of the 15 pieces of electronic equipment needed to present the agency's new multimedia show, "A Special Genius."



tional group would be an ideal place to take our show," Kelley added, "particularly if the audience is one that entertains misconceptions about the work of SCS and the districts." ♦

Upstream dams reduce flood damage

Rains that caused severe flooding in Denver and parts of northeast Colorado last spring proved once again that land treatment and upstream flood prevention dams can reduce flood damages substantially.

M. D. Burdick, SCS state conservationist, cited two watersheds near Kiowa as indicative of the benefits provided by watershed protection projects.

Kiowa Creek, with a 125-square-mile drainage area upstream from Kiowa, caused little damage in Elbert County. Sixty-three flood prevention dams were installed in this watershed in 1961.

Running Creek, with no dams, caused more than \$80,000 in damages to roads, bridges, machinery, crops, and livestock. The drainage area of Running Creek, which parallels Kiowa Creek several miles to the east, is only 100 square miles. Sediment damage was severe along Running Creek. A diesel truck was completely buried in mud north of Elizabeth.

Both watersheds received an

average of 4½ inches of rainfall in 18 hours.

Burdick said the flood prevention dams on Kiowa Creek stored about 800 acre-feet (260 million gallons) of water and released it slowly for 2 days. This greatly reduced the peak flow. Measurements at Kiowa showed a peak flow of 2,000 cubic feet per second. The peak flow on Running Creek was 8,000 c.f.s.

Four days after the storm, the flow on Running Creek was down to 90 c.f.s., but Kiowa was flowing at 120 c.f.s., indicating that some water was still being released from the Kiowa project dams.

Unfortunately, benefits of the flood control structures were not felt in Wiggins, 75 miles downstream from Kiowa Creek, because of the vast areas of untreated watershed in Arapahoe, Adams, Weld, and Morgan Counties, which contributed uncontrolled runoff. ♦

Illinois field days set

Erosion control, wildlife management, and beautification practices will be installed on two Illinois farms in 3 days, from August 21 to 23, 1973.

Also, plans have been completed for a livestock waste management system to be constructed on one of the farms and to be demonstrated during the soil and water conservation show.

This waste management demonstration is sponsored by the Institute of Environmental Quality, the Environmental Protection Agency, and the Illinois Beef Industry Council. The engineering plans were prepared by the Soil Conservation Service and checked with the Agricultural Engineering Department at the University of Illinois.

The field days are being organized by the Illinois Chapter of the Land Improvement Contractors of America, with the support of the Soil Conservation Service and Extension offices, University of Illinois, districts, and equipment manufacturers.

The farms, owned by Ron Lawfer, are located in Jo Daviess County, 3 miles east of Stockton on U.S. 20. The public is invited. ♦

And on the farm there was a golf course

The farm pond now poses a hazard to golfers. And there are lush fairways where cattle once grazed.

Copiah-Lincoln Junior College, near Wesson, Mississippi, has converted 100 acres of farmland into a 9-hole golf course. Other recreation facilities on the college's 446 acres include tennis courts and a baseball field.

The idea to convert part of the acreage to recreation use origi-

nated with Billy Thames, the president of the college. It got a boost from Sturge Dodds, a college trustee and commissioner of the Copiah County Soil and Water Conservation District. After the Soil Conservation Service helped prepare a conservation plan for the area, the idea was well on its way to becoming a reality.

First, terraces, fences, and

hedge rows had to be removed from the 100 acres earmarked for the golf course. A drainage system had to be designed so excess rainfall could run off in a few hours. Some eroded spots had to be filled, shaped, mulched, and seeded to grass. Other areas had to be shaped, graded, and seeded.

An irrigation pit was dug to get water from a spring, and a sprinkler system was set up to irrigate the tees and greens.

The right kind of soil for greens is generally in limited supply and therefore a big cost to most golf course builders. President Thames, with the help of an SCS soil scientist, located soils that could be used to make up a mixture that was 70 percent sand, 20 percent clay, and 10 percent organic matter.

The big job was transporting the soil to the area to build the greens. Friends of the college helped, and most of the work was done with college equipment. This, estimated Thames, saved the college 50 percent of the cost of building the golf course.

Golfers began to play the course in 1968. Today, more than 100 students and faculty and their friends play in 1 day.

If the student body continues to expand, an 18-hole course will be in order—and the college is already working on this.

Co-Lin Junior College has given up farming on part of its acreage, but it hasn't forgotten that the land still needs treatment and protection, regardless of its use.—C. E. PERROTT, *district conservationist, SCS, Hazlehurst, Mississippi*. ♦

Conservation and recreation sites

Continued from p. 270

tices used on many recreation sites include access roads, critical area planting, dams, debris basins, dikes, disposal lagoons, diversions, fencing, field borders, firebreaks, fish stream improvement, fishpond management, grade stabilization structures, grassed waterways or outlets, heavy use area protection, hedge-row planting, pipelines, ponds, land grading and shaping, spring water development, streambank protection, and tree planting. In addition, many drainage, irrigation, and wildlife practices are applied.

Vegetation

Natural vegetation should be saved if possible when installing a recreation facility.

Any vegetation provides some control of noise and dust. Trees

and shrubs in dense stands are very effective in reducing sound levels from heavily traveled roads or intensively used play fields. Plants break up sound waves, change their direction, and reduce their intensity. Proper landscaping can reduce noise about 60 percent, according to "Green Survival" published by the American Association of Nurserymen.

Vegetation also protects the recreation site by providing needed erosion and sediment control, and it safeguards fragile areas, critical areas, and heavy use areas. Vegetation provides traffic barriers, privacy screens, and shade, and it helps control dust and noise.

Alternatives to seeding grass may need to be considered. Such alternatives would include sodding, the use of sawdust, wood chips, gravel, or sand, and paving intensively used areas.

Followthrough

After the recreation facility has been completed and is in use, SCS can help to appraise the impact of intensive use on the basic resources, to revise plans because of land use changes, and to plan, design, and install additional conservation practices needed to improve the quality of the recreation area.

High-quality technical standards and specifications are necessary to avoid deterioration of the recreation area into a recreation slum. ♦

Down to earth assistance has been provided to the Goddard Space Flight Center, Greenbelt, Maryland, by the Soil Conservation Service's National Plant Materials Center. A program to return Goddard's grounds to "nature," using seedlings of various woody plants including loblolly pine and tatarian honeysuckle, should improve the grounds and reduce weekly mowing acreage from 400 acres to 60 acres. Erosion control and wildlife habitat improvement also are goals of the program.

Adding fuel to the crisis. Urban and suburban developers recently have come in for heavy criticism from environmental groups. Removing vegetation to make way for concrete and asphalt is a target of the critics. Reducing vegetation eliminates much of the natural cooling provided through plant transpiration and evaporation and through the lower solar energy absorption of plants. Thus, removing vegetation contributes to the energy crisis because it makes more air conditioning necessary.

Increasing farm wildlife. Tennessee landowners who want to increase the wildlife production on their land can contact the Tennessee Game and Fish Commission for help. "The Commission has expanded its landowner assistance program in the area of farm wildlife management," reported James L. Byford, assistant professor with the University of Tennessee Agricultural Extension Service. "Landowners who want help will be visited by a biologist who will make a wildlife management plan according to the landowner's wishes." Byford explained that the plan can be

drawn up as intensively as desired, with the objective being to increase wildlife in Tennessee. The landowner has the option to hunt the land himself, let other people hunt, or not hunt at all.

Detecting blight. Plant breeders combating southern corn leaf blight have developed a rapid means of screening corn plants on a large scale to determine their resistance or susceptibility to *Helminthosporium maydis* (race T). The test involves injecting individual plants with a solution of blight toxin, then observing the reaction, if any, within 2 or 3 days. Because the new technique does not require the use of live disease organisms in the field, it eliminates any danger of contamination or accidental spread.

Heat and eat. Frozen and other convenience foods are going over big in Western Europe. Processed food sales are growing at double the rate of total food sales, with some convenience food volumes gaining at a rate of up to 20 percent per year. The sale of frozen foods is expected to triple by 1980, and the outlook is for a doubling of the institutional food volume to \$280 million a year within 5 years.

In today's agriculture, almost every year brings some new technological development that could make a difference in the way farmers spend their money. That's the reason USDA's Statistical Reporting Service plans to launch an annual survey on the purchasing patterns of producers—asking them about their spending for such broad categories of farm goods as feed, seed, livestock, and fertilizer as well as production items that are com-

mon to both farm and nonfarm people: interest, taxes, cash wages, fuel, repairs.

Ecology's day in court comes on Fridays in Jefferson County, Kentucky. The county's new Ecology Court hears all environmental complaints and takes legal actions. It has heard about 1,000 cases to date and levied \$17,000 in fines to area polluters. The charges range from burning leaves in backyards to serious air and water pollution offenses.

Hit the trail. A number of small cities in the state of Washington are designating streets as bicycle routes and erecting signs showing the designation. At the same time, they are on the lookout for rights-of-way under power lines, along irrigation canals, and over pipelines that can support multipurpose trail developments.

Construction guidelines. SCS Engineering Memorandum 66 (Rev. 1) of June 21 states guidelines for minimizing soil erosion and water and air pollution during construction carried on in whole or in part under agency programs. The need for pollution abatement will be determined on a site-by-site basis. Essential considerations for controlling pollution during construction include: minimum practicable exposure of erodible soils; temporary vegetative cover followed by permanent cover; control and disposal of runoff; temporary and permanent debris basins; dust suppression; temporary bridges or culverts where stream fording is damaging; protective measures against chemicals, fuels, lubricants, and sewage; safe placement of sanitary facilities; and prevention of grass or brush fires.

Review

New publications

Water and Our Future: An Urban Planning Manual for Local Officials. 1972. *National Association of Counties Research Foundation* (Washington, D.C.). 111 pp. \$5.45. Discusses the water resources problem and gives an outline of the local elected official's role in the formulation of water resources decisions, policies, plans, and programs.

Landfill Decomposition Gases, an Annotated Bibliography. 1972. *National Environmental Research Center* (Cincinnati, Ohio). 34 pp. \$3.75. Annotates articles concerning landfill gas generation and generation rates, gas composition, gas movement rates and travel distances, and gas control techniques.

Climate Change and the Influence of Man's Activities on the Global Environment. 1972. *National Center for Atmospheric Research* (Boulder, Colo.). 31 pp. \$3.75. Discusses the possible effect of pollution caused by the impact of carbon dioxide, particulate matters, "albedo" changes, irrigation, and the direct release of heat on the earth's climate.

Growth and Yield Predictions for Upland Oak Stands, 10 years After Initial Thinning. By Martin E. Dale. 1972. *USDA Forest Service Research Paper NE-241, Northeastern Forest Experiment Station* (Upper Darby, Pa.). 21 pp. Based on 154 permanent plots, growth and yield equations were developed for upland oak stands that receive an initial thinning. Combinations or transformations of common stand variables, such as stand age, basal area, site index, and number of trees per acre were used. Estimates

of yield in terms of total cubic-foot volume, cordwood, and board-foot volume are given for a wide range of stand age, basal area, and site quality conditions. Volume and basal-area growth predictions over a 10-year period are presented for the same wide range of initial stand conditions.

Federal Funds for Research Development and Other Scientific Activities, Fiscal Years 1970, 1971, 1972. *National Science Foundation, NSF 71-35, Volume XX.* 242 pp. \$2. Twentieth in an annual series, this report provides comprehensive statistical information on the size and scope of federal obligations for scientific activities and the types of institutions and purposes to which such funds are directed.

Engineering Hydrology. By Jaromir Nemec. 1973. *McGraw-Hill.* 316 pp., illus. \$11. Beginning with a concise treatment of surface water hydrology concepts, the book covers the measurement of all the connected elements of the hydrological cycle. It describes the most recent statistical and parametric methods for the processing and analysis of hydrological data. The book also has an international approach because it contains a critical synthesis of current practices and results of research in central and eastern Europe, the Ukraine, and other countries.

Bibliography of Water Quality Research Reports, June 1972. *U.S. Environmental Protection Agency, Office of Research and Monitoring.* 45 pp. The published reports listed were prepared by or for the Environmental Protection Agency and are available for purchase from the U.S. Government Printing

Office or the National Technical Information Service (Springfield, Va. 22151).

What the U.S. Department of Agriculture Can Do When Natural Disaster Strikes. 1972. *USDA PA-533.* 8 p.-illus. folder. Outlines the help USDA can give and how to get that help when tornadoes, earthquakes, floods, and many other natural disasters strike.

Forest-Range Environmental Production Analytical System (FREPAS). By H. Fred Kaiser, Kenneth DeBower, Ronald Lockard, and John W. Putman. 1972. *USDA Agr. Hbk. 430.* 211 pp., illus. \$2.75 FREPAS provides the analytical and computer capability required by the Forest-Range Environmental Study (FRES), which was designed to (1) review the present national range situation, (2) project future needs, and (3) derive alternatives for future Forest Service range programs.

Site Preparation and Reforestation of Droughty, Acid Sands. By Russell M. Burns and Edwin A. Hebb. 1972. *USDA Agr. Hbk. 426.* 61 pp., illus. \$0.45. Unmerchantable scrub oaks and wiregrass dominate millions of acres of sandhills land in the Southeast. Conversion to pine requires reduction of competition for moisture and nutrients and selection of species suited to the soil and climate. The bulletin recommends procedures, based on 45 years of research, for land managers and owners of small woodlands for site preparation and reforestation of the droughty, acid sands.

Rates and Depths of Mixing Lime and Fertilizer for Alfalfa. By O. H. Long, L. M. Safley, J. A. Odom, and Herman Morgan, Jr. 1972. *The University of Tennessee Agricultural Experiment Station Bull. 495* (Knox-

ville). 41 pp., illus. This bulletin reports on eight rate-of-lime experiments on alfalfa. In all experiments except two, the rate of fertilization (phosphate and/or potash) was varied, and the micro-nutrient molybdenum was a variable in two experiments. Six soil series and four physiographic regions are represented. These are: Hartsells (Sumnerland Plateau), Dickson and Mountview (Highland Rim), Maury (Central Basin), and Alcoa and Etoawah (Valley of East Tennessee).

Conservation Activities for Girl Scouts. 1973. USDA PA-1009. 32 pp., illus. \$0.50. *Supersedes Soil and Water Conservation Activities, USDA PA-664.* This publication describes 21 activities on conservation practices or resource observations and studies based on ecological principles that underlie all conservation projects. Some of the activities include projects on soil formation; soil particle size; water intake in the soil; organic matter in the soil; life in the soil; movement of water through soil; and soils affecting plant growth. Most of the activities can be done by Girl Scouts of any age, although younger girls may need some help in applying the interpretations to the broad environmental problems of camp or community.

Soil surveys

Somerset County, Maine, Southern Part. By John R. Arno, R. B. Willey, W. H. Farley, R. A. Bither, and Bruce A. Whitney. 1972. *Soil Conservation Service in cooperation with University of Maine Agricultural Experiment Station.* 74 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Lane County, Kansas. By Kenneth H. Sallee. 1972. *Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station.* 62 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Niagara County, New York. By Bradford A. Higgins, P. S. Puglia, R. P. Leonard, T. D. Yoakum, and W. A. Wirtz. 1972. *Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station.* 199 pp., illus.; maps 4 inches to the mile (1:15,840).

Chilton County, Alabama. By R. B. McNitt. 1972. *Soil Conservation Service in cooperation with Alabama Agricultural Experiment Station and Alabama Department of Agriculture and Industries.* 82 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Ochiltree County, Texas. By Frankie F. Wheller. 1973. *Soil Conservation Service in cooperation with Texas Agricultural Experiment Station.* 47 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Meetings

July

- 1-6 National Education Association, Portland, Oreg.
- 8-11 American Association of Agricultural College Editors, Guelph, Ontario.
- 8-12 The American Society of Landscape Architects, Mackinac Island, Mich.
- 10-14 National Society of Professional Engineers, Chicago, Ill.
- 11-13 The Izaak Walton League of America, Duluth, Minn.
- 14-18 American Association of Nurserymen, Inc., Minneapolis, Minn.
- 22-25 National Association of Counties, Dallas, Tex.
- 21-25 National Association of County Park and Recreation Officials, Dallas, Tex.
- 26-27 Great Plains Agricultural Council, Manhattan, Kans.

August

- 12-15 Conservation Education Association, Murray, Ky.
- 15-17 American Society of Civil Engineers, Hydraulic Division Conference, Bozeman, Montana.
- 26-31 American Chemical Society, Chicago, Ill.

September

- 10-15 American Fisheries Society, International Association of Game, Fish and Conservation Commissioners, Disney World, Fla.
- 23-27 Society of American Foresters, Portland, Oregon.
- 24-28 First World Congress on Water Resources, "Water for the Human Environment," Chicago, Ill.
- 26-30 International Symposium on Underground Waste Management and Artificial Recharge, New Orleans, La.
- 29-Oct. 4 National Recreation and Park Association, Washington, D.C.
- 30-Oct. 3 National Agricultural Chemical Association, White Sulphur Springs, West Virginia.
- 30-Oct. 3 Soil Conservation Society of America, Hot Springs, Arkansas.
- 30-Oct. 4 Association of Conservation Engineers, Grand Canyon, Arizona.
- 30-Oct. 5 Water Pollution Control Federation, Cleveland, Ohio.



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From the Administrator:

By any other name . . .

Some people have accused the Soil Conservation Service of being "a promotional agency."

We couldn't agree more!

In the 1930's SCS promoted the establishment of local conservation districts to battle widespread gullies, duststorms, and abandoned farmland—believing that conservation could be accomplished better by voluntary local decisions than on the basis of federal regulations or requirements.

The result: more than 3,000 strong, capable local units of state government that have put an almost unbelievable array of conservation work on the land and have helped their communities meet many more aims besides control of soil erosion.

SCS promoted the planting of tree windbreaks and shelterbelts where wind erosion was a constant problem—and landowners responded by putting in three-fourths of a million miles of farmstead and feedlot windbreaks and nearly 100,000 miles of field windbreaks that not only slowed the wind but also made the countryside more scenic and helped increase wildlife habitat.

SCS promoted building terraces to aid in water control and to hold the soil in place—and conservation district cooperators put more than 1.2 million miles of terraces on their land, including the new kinds that can handle today's multirow farm machinery.

SCS promoted various forms of minimum tillage to cut soil erosion by as much as 95 percent—and landowners turned to this method of farming on 24 million acres in a decade, saving on fuel as well as soil.

SCS promoted local watershed protection and flood prevention projects—and the thousand projects completed or underway have prevented \$270 million in flood damages, trapped 16.6 million tons of sediment, and brought \$347 million in benefits from erosion control and grassland improvement. They've

brought new jobs, new water supplies, and 6 million visitor-days of new recreation opportunity to rural communities.

SCS promoted a special conservation effort in the Great Plains to meet thorny climatic problems in farming and ranching—and 44,000 landowners signed long-term contracts under which they have converted or plan to convert 2.6 million acres of cropland to more suitable uses and have carried out other improvements for a better agriculture and cleaner air and water.

SCS promoted multicounty efforts to boost economic and social opportunities through natural resource improvements—and from 10 pilot projects the resource conservation and development effort has grown to cover more than a fourth of the United States, raising community incomes and hopes through local ideas and action.

SCS promoted the use of soil and other resource information to guide community growth as well as farm operations—many local governments now are helping to pay the cost of soil surveys to get the information faster.

Now, SCS is helping to spread the word about sanitary landfills to replace open dumps, about systems to recycle agricultural wastes, and about many more practices that can help meet environmental goals.

On whatever front of soil and water conservation SCS people may be working they'll present old and new ideas for good land use and good environmental quality—be it for 1 acre or the whole nation. They'll help put on the land the ideas that a landowner or community decides to adopt.

If helping to make America's land and water look better, produce more, and last longer makes us promoters, we'll enjoy the designation as we keep working.

Kenneth E. Grant